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APRIL 9TH, 1878.

JOHN EVANS, Esq., D.C.L., F.R.S., *President, in the Chair.*

The minutes of the previous meeting were read and confirmed.

The following presents were announced, and thanks were ordered to be returned to the respective donors for the same:—

FOR THE LIBRARY.

From the EDITOR.—Revue Internationale des Sciences, Nos. 13–14, 1878.

From the SOCIETY.—Proceedings of the Royal Geographical Society. Vol. XXII, No. 2.

From FRANCIS A. ALLEN Esq.—Uber Hundert fünf und dreissig Papúa—Schädel; Die Kalangs auf Java; Probe der Mafoor-'schen sprache; Uber die Papuas von Neu-Guinea; Bericht ueber eine reise nach Neu-Guinea; Ueber die Negritos oder aëtas der Philippiner. By Dr. A. B. Meyer.

From the SOCIETY.—Transactions of the Geological Society of Glasgow. Vol. V, Part 2.

From the AUTHOR.—Die Anthropologischen Sammlungen Deutschlands. By Prof. Schaaffhausen.

From the ACADEMY.—Atti della R. Accademia dei Lincei, Vol. II, No. 3.

From the SOCIETY.—Bulletin Société Impériale des amis d'histoire Naturelles d'Anthropologie et Ethnographie. Tome XXVII, Moscow.

From PROF. W. H. FLOWER, F.R.S.—Sur la Mensuration de la Capacité du Crane; Etudes sur les propriétés hygéometriques des Cranes. By Dr. Paul Broca.

From the EDITOR.—Revue Scientifique, Nos. 39–40, 1878.

From the EDITOR.—"Nature" (to date).

From the EDITOR.—Materiaux pour l'histoire de l'homme, Feb. 1878.

From the SOCIETY.—Proceedings of the Royal Society. Vol. XXVII, No. 185,

From the AUTHOR, through the President.—Illyrian Letters. By Arthur J. Evans, B.A., F.S.A.

The following paper was read.

On METROLOGY *and* GEOMETRY *in* ANCIENT REMAINS, BY W. M. FLINDERS PETRIE, Esq.

AMONG the various tests of the mental capacity of man, one of the most important, ranking in modern life on an equality with language, is the appreciation of quantity, or the notions of measurement and geometry. This may lay claim to a more important place than language, in some respects; as it is a more delicate test of exact capability, ebbing and flowing more freely with variations of intelligence, yet present to some extent in the very lowest races, and developing in the highest culture more rapidly than language.

Not only is metrology a test of the powers of separate races, but it serves, like language, to show the connections of races; and, as the foreign language of a superior and dominant race is imbibed by their inferiors, or acquired for commercial purposes, from just the same causes measures of one race may extend to others by external circumstances, without always implying a fusion of races or a common origin. Thus the possession of the same unit of measurement by different people implies either that it belonged to their common ancestors, or else that a very powerful commercial intercourse has existed between them.

The ideas of numbers are also useful tests, bearing both on the capacities and the connections of races. A mere binary multiplication or division of a quantity is performed by the lowest state of mind; whereas, a decimal or duo-decimal system shows a much higher power of combining quantities, mentally and mechanically. The use of favourite numbers is also worth consideration, as it is very constant in different races. The Babylonian 6, and the early Jewish 10, are familiar instances.

A good test of the capabilities of a people is the average

accuracy of their workmanship; and though of course there are workmen of very varying character in all countries, yet by taking the averages of large numbers the results will be fairly comparable. It is found, on examination, that there is not as much difference in the average accuracy of different countries and ages as might be expected; Assyrian and prehistoric remains showing both an average error of $\frac{1}{100}$, and the highest class, the Greek and later English remains, having as large an average as $\frac{1}{200}$.

Although the value of units of measure, as tests of races, has been more or less recognized for many years, yet hitherto no methods have been systematically devised to extend this instrument of inquiry to those races whose units of measure are lost to us, but whose constructions executed in terms of those units still remain, and are in many cases the principal traces of their builders. Newton, however, in this, as in the rest of modern science, has laid the foundation; for in his "Dissertation on Cubits" he proceeds on the principle of recovering ancient measures by the relative ratios of the dimensions of buildings.

Now considering, first of all, the remains of those people who are known to have commonly used measures—Egyptians, Greeks, or Romans—if in any buildings erected by such a people we find a dimension continually recurring—there is a strong presumption that this dimension was some simple number of the unit used by the architect, as it would be highly improbable that such a result should occur by mere chance. But we are wholly ignorant of what number of units this length contained and equally ignorant of the length of the unit. If, however, instead of often finding one length repeated, we often find halves, doubles, and quadruples of a length, we have very nearly the same presumption that these multiples of the length are connected with it, as that the repetitions of the same length are connected together.

If, then, on examining the dimensions of a building together, it is found that they all bear simple relations to one another, it is highly probable that this is not the result of chance, but of their being all simple multiples of the unit used in the building. Now, knowing the relations of these lengths to each other, it is evident that we only need to combine all these ratios together, to obtain a series of numbers, one to each length, which shall be the only series of simple numbers bearing the same relations to one another as is borne by the measured lengths; or, in arithmetical phrase, their greatest common measure will be the unit by which they were laid out.

For instance, in a stone cist, found at Jerusalem, the dimensions are 12, 15, and 30 inches (omitting fractions as unnecessary for

illustration), it is evident that 15 contains half the number of units that there are in 30 inches; but 12 inches is two-fifths of 30 inches, therefore 30 must contain 5 or some multiple of 5 units, for 12 to contain a simple number; thus we see that no numbers but 4, 5, and 10 (or double or half of these) can have been the multiples used by the constructor; 4, 5, and 10 times 3 inches being 12, 15, and 30 inches. Three inches then (or more likely double of it) was the unit used in laying out the work. Here, as there are only three measurements, it leaves an uncertainty whether this 12, 15, and 30 inches may be 2, $2\frac{1}{2}$, and 5, or 4, 5, and 10, or 8, 10, and 20, or other numbers of units bearing the same proportions to each other. This is only an uncertainty belonging to cases where but few dimensions are considered; for if we found in a building lengths which bore the proportions 5, $2\frac{1}{2}$, $1\frac{1}{4}$, 8, 12, 16, to each other, these must be the multiples of the unit, for if we halve these proportional numbers (or double the unit) we have on the one hand the less likely fraction of $\frac{5}{8}$ instead of $1\frac{1}{4}$; and if we double these numbers we have on the other hand the less likely multiple 32 instead of 16; thus it is plain that these are much the simplest and most likely series of numbers proportional to the dimensions, and that the lengths in the building must have been originally laid out as containing these numbers of the unit.

There are other forms of this method of obtaining the original constructor's unit of a building; but they are all similar in principle, and need not be entered upon in giving a general outline of the investigations.

It is hardly necessary to observe that the whole of this depends on probabilities; it is possible that a large quantity of purely casual dimensions might all have simple relations to one another, but it is highly improbable; if, however, there is not a large number of dimensions to be considered, and if, from roughness of construction, it seems likely that allowance must be made for inaccurate work, then the possibility of casual coincidence becomes such that a portion (say $\frac{1}{10}$th or $\frac{1}{20}$th) of the results from a series of monuments are liable to be fallacious.

There are, however, two checks on the liability to casual coincidences, which are most effectual. We may premise that not only may the unit of a monument be ascertained from the dimensions, as already shown, but the mean value of it may of course be found from combining all the dimensions; and, further, the *probable error* of this mean value. The greater the probable error, the greater is the uncertainty as to the result; and the more closely the various lengths agree in showing the unit, the less will be the probable error of the mean. Now, not only may we ascertain the unit of a building, but if a unit was in use in a

country a large number of remains ought to be found, all constructed in terms of that unit; and, accordingly, the average of all the slightly varying results extracted from various buildings may be taken to obtain the average length of the unit throughout the country. Here, the two checks on the fallacious results come into play, for if a mean unit that has been extracted from a building be merely fallacious, it is very improbable that another fallacious result will agree with it, and that three or four fallacious results should all coincide is practically impossible; thus if the mean units of several buildings are found to agree together, it may be taken as certain that they are not mere fallacies.

The second check is, that if a unit be fallacious—that is to say, if several lengths have by chance so nearly simple relations between them as to appear the result of intention—it is highly unlikely that these relations will be all very exact; on the contrary, more and more of these fallacious results will be found on looking at relations which are less and less exact; thus the fallacious relations being on the average far less exact than the intentional relations, they will, as already noticed, have a far larger probable error. Further, as in taking the average of the values of the unit shown in various remains, the units will be weighted inversely according to the square of their probable errors; thus if a fallacious result happens to agree to a group of similar units, it will most likely have a larger probable error, and so have far less weight than the others in taking the mean. From these considerations it is evident that we have the means of not only ascertaining the unit used in a building, but also of checking and almost eliminating the few results of casual coincidence that may occur. And it is well to remember that all the sciences, beyond pure mathematics, rely wholly on the improbability of a series of casual coincidences, in the experimental researches on which all their laws depend. There is a possibility, however remote it may be, that even the law of gravitation is false, and that everything that obeys it does so by casual coincidences.

Having thus the means of ascertaining the unit of measure, and the multiples of it employed, the use of special numbers as favourites is shown by the character of the multiples; in one case the multiples may be mainly binary, and in another case 3, or in another 5, may be the favourite number.

This method of extracting the units of measurement having been extensively tested, by applying it to the various remains of the people of the Mediterranean, whose standards of measure are tolerably known, the general results are (carefully avoiding all chances of unconscious bias) that three-quarters of the mean units

found by this purely inductive examination of the ancient remains, are units historically known to have been used; and the remaining quarter are never so widely diffused as the others, and are therefore less important and less likely to be preserved in history. So far then as theory and practice can both give us confidence in a new method, it seems that we may rely on this fresh instrument of inquiry.

In turning to non-historic remains, and trying to recover whatever is possible from these unlettered records, it should be remembered that the inductive methods of metrology do not compel a result to appear, and yield a fallacious answer if there be no true one; if no unit has been used in the construction of a work, usually no unit will be obtained by this method of examination; it is not a conjuring tool to produce something out of nothing, but a key enabling us to unlock whatever may exist. It should not therefore be said that it is useless or impracticable to apply it to remains that may be commonly supposed to be barbarically unmetrical; on the contrary, let us use the reasonable means of inquiry cautiously, and see how far they will lead us, and the results will probably be as already found—that is, that the lower we go in the scale of regularity, the fewer cases do we find of any unit appearing by inductive examination.

With regard to the metrology and geometry apparent in non-historic remains, the proofs of design that are met with only give evidence of a minimum of intelligence in the constructors; how far higher they may have been capable of going, and may have gone, in their unrepresented ideas, is unknown. If the mental capacities of Londoners were to be estimated by the winding and irregular character of a large number of their streets, and the chance angles at which many of them meet, the opinion of them would not be very high.

The best illustrations of the character of the more regular and geometrical remains of non-historic times, will be a few of the plans of such remains that are here shown. These plans are a portion of a series that I have accurately surveyed on purpose to examine the amount of regularity and skill shown in the construction of those earthworks; about 100 such plans are done, and copies are placed in the British Museum Map Department, for the use of all interested in such remains. If they do not give all the details of levels, &c., required in various other inquiries, they will at least serve as accurate bases to which other details can be readily added, as the probable error of the points fixed is mostly $\frac{1}{50}$th of an inch on the plan.

From accurate plans a great deal can be ascertained as to the methods and order of the construction of earthworks; what points

were laid out with care, and what were left to be filled in by eye; whether works were begun at several points at once, or whether they were all made from one end, and many similar details, which throw light on the ways of the workers. In some few cases, attention to geometric forms, circles, rectangles, and straight lines may be found, without regard to equality or measurement; and in other cases equal lengths may be found laid out, and the work finished by eye without much regard for geometry; but usually measurement and geometry accompany each other to a considerable extent, in the more regular works, which are however only a fraction of the whole. Any one of the following examples if it stood alone might not be above doubt, as to the intentional origin of its regularity; but when so many earthworks are each of a character for which it would be difficult to account by mere chance, their evidence becomes very forcible.

As an illustration of the metrical character of earthworks, we may refer to the East Everley works in Wiltshire; these are banks and ditches of the ordinary style, about a couple of feet high, lying on an open piece of down. On examining the plan it is found that the distances of most of the banks are all simple multiples of one length, many of them being two, three and four times the basis. The first striking objects are three banks at equal distances apart, the distance between the two outer banks being twice repeated in other parts; and on examining the other distances with this basis they are seen to agree to it in a manner beyond all probability of mere casual coincidence. Parts of this work were so evidently added by men who had far less regard for right-angles and regularity than the first workers, that we need not be surprised at their not paying the attention to measurement that is shown by their more careful predecessors. The length of the unit apparently shown in these banks is 691 inches $\pm$ 5, which is 32 times a unit most frequently found in such works; 32 is a likely number to occur in rude works, as it would merely result from a repeated doubling, 2, 4, 8, 16, 32 of the unit, on a rope or cord.

In the earthworks at Hill Deverill, Wilts, considerable regularity of dimensions is also to be seen; and the banks are connected with a singular semi-circular earthwork of very true form, the mean difference from a true semi-circle being only 16 inches on a work 380 feet across. The radius of the semi-circular bank is exactly equal to four of the units of the straight banks outside it, which points to a connection between them. The form of it, and the ditch being placed inside the bank, where no strategical reasons exist for such an arrangement, both seem to show that it was not intended for defence.

The accuracy of other circular earthworks is greater than at Hill Deverill; a circular bank and ditch, commonly called a flat barrow, at West Everley has a mean error of only 7 inches from a true circle, on a diameter of 150 feet, or less than $\frac{1}{250}$ error; and this 7 inches includes my errors of estimating the true centre of the bank (15 feet wide), and of surveying and plotting. The circle at Chilham, Kent, has also under 4 inches mean error on 130 feet diameter. The great earth circle of Stonehenge is about as true as these other circles, the mean error being only 9 inches (including my own errors of survey) on a diameter of over 300 feet, or $\frac{1}{400}$; the mean error of the outer circle of sarsen stones from a true circle is 3·2 inches on a diameter of about 100 feet or $\frac{1}{400}$; the outer circle of blue stones is much less accurate, having a mean error of 9 inches on about 75 feet, or $\frac{1}{100}$; and the inner semi-circle of blue stones has 3 inches mean error on about 40 feet on $\frac{1}{160}$th. We will not pause now to enter into the various conclusions that may be drawn from an accurate survey of Stonehenge, with regard to the relative date of various parts, and of works connected with it; but the figures just mentioned show that the mean errors from true circles are small in all the parts, and least of all in the great earth circle and sarsen circle; the errors are all ascertained by a survey of Stonehenge which I made on purpose for accurate examination, and in which over a thousand measures were made correct to a fraction of an inch, so as to make it certain that modern errors of survey were not attributed to the ancient constructors.

Circles are of course the easiest forms to make; but the care taken in throwing up banks and ditches 15 or 20 feet wide each, and yet maintaining the centre of the bank true to a few inches, shows that much importance was attached to making accurate and regular figures. In fact, with so much care given to regularity, it would be intrinsically probable that some regular unit of length would be, either transiently or generally, adopted; even if there was not such strong evidence for it in other works containing equal and proportional lengths. In a square at Upavon, care has been given to make the sides equal, as their mean difference is under a foot on a length of 110 feet; but in this, as in all the other earthworks, there is a lamentable deficiency in good right-angles; very few are to be found with less than a degree of error, and 5 degrees of error are often found.

In a very remarkable, and probably quite unique set of works at Steeple Langford, there are some of the best right angles; a raised plateau on the west is truly rectangular, with an average error of only 5 inches; and considering that it has been exposed for perhaps thousands of years, and that my errors of

estimating its form, and of fixing the positions of the corners in a survey extending about ¼ of a mile, are all included in this 5 inches, it would be rather hard to charge the original workers with any perceptible amount of the error. The long and short sides are in the ratio of 5 to 3, with an average error of only 4½ inches on 70 feet; and this again is so small an error that it can scarcely be charged on the constructor. The unit used in laying it out, 5 for the side and 3 for the end, is just 10 of a unit commonly found in other earthworks; the sides being thus 50 and the ends 30 measures in length.

The circle divided into equal squares is apparently not so accurate, the mean error being 7 inches on 130 feet, but it is so very faint that the whole of it cannot be traced, and much of the error may be due to misinterpretation in surveying; in any case it is a strange piece of work, quite unaccountable on any simple utilitarian hypothesis, and shows a considerable love of geometry. With regard to this and other cases, it is well to state that the method of surveying adopted was such that I was wholly ignorant of the forms or equalities of any of the works, until the plotting was done some weeks afterwards; and thus there was no chance of *cooking* the survey, or assuming that any lines were equal, parallel, or at right-angles without proof. The other works around this circle are also peculiar, but do not call for notice in our present subject.

The most remarkable earthwork yet surveyed is one on the open down near Orcheston, Wilts; remarkable not for the detail of it, but for its form, which is a true ellipse, with an average error of only 11 inches on about 400 feet: and when it is considered that it has been all ploughed over, and unhappily a quarter of it obliterated, it is plain that the errors of determining its original form will swallow up most if not all of this 11 inches. The outer ellipse has apparently been made by eye or rough measurement from the inner, after that was formed. Such a regular outline as this inner ellipse might occur by chance, and we may say that in thousands of chance forms one ellipse would probably occur as accurate as this; but the improbability of finding it among only a couple of dozen of circular figures yet surveyed is such as to place its intentional construction beyond any reasonable doubt.

An ellipse shows far more than other figures the method of the constructors; remembering that there are three practical ways of describing an ellipse: first, by lengthening all the parallel chords of a circle in one direction; second, by a rectangular trammel, and a beam with points traversing the trammel; third, by a cord fastened at the two ends to the two foci, and a point traversing within the cord, by examination it can be toler-

ably settled in which of these three ways it was drawn. Not that I would suggest that this shows the constructors to have understood conic sections, or the properties of an ellipse; but merely that they knew by some means how to draw an elegant and regular oval figure, which was probably all they cared for. In the first two methods, by elongating a circle and by trammel and beam, the major and minor axes of the ellipse are the measured points; whereas by the third method by string, which is easier, the major axis and the distances of the foci are the measured points. Now a man who cared enough for an unusual figure to take such trouble about it, would certainly lay it out by measure, especially as we see that far less regular and intellectual works have considerable uniformity of dimensions. On looking then at the proportions of it, we find that the major axis has no simple ratio to the distance of the foci, therefore the third or string method was not adopted in laying it out; but the major and minor axes have exactly the ratio of 12:10, and from this the only conclusions are that either, *first*, the ellipse was laid out by elongating a circle drawn on the ground, which would require the worker at least to be capable of dividing any line into five parts and then adding a fifth to it; or else, *second*, that some modification of the beam and trammel method was adopted. This last is more probable, as two lines at right angles in the ground, a cord, and three men, is all that would be absolutely necessary. But though the means may be thus simple, the work shows an amount of appreciation of geometry, and of skill in execution, that would be rather surprising to find even in Greece or Egypt; and, when we look at the ground inside the work, and find it strewn with hundreds of chipped flints, which are only found perhaps once in a mile's walk outside the enclosure—the inferences, either that the flint workers appreciated and drew an ellipse, or else that we have here a series of coincidences which seem beyond all probability, are such as to warrant an exhaustive examination of these remains.

It might be suggested that a more intellectual people subsequently occupied a flint workers' site, and there laid out the ellipse; but there is nothing to give colour to such an idea, as there is no natural peculiarity of the ground to induce a man to settle there in preference to any other part of the gently sloping downs all around it; and it would be very unlikely that a subsequent people should exactly pitch on the spot strewn with flint flakes, and exactly enclose it with this ellipse, without having any of the flint-strewn ground outside it. As before mentioned, in this as in all the experimental sciences, everything rests on what is likely and unlikely, and until equally distinct evidence to the contrary can be given, the only reason-

able conclusion seems to be to accept the facts as they stand, and say that at present it appears to be 10 to 1, 100 to 1, or 1,000 to 1, that such and such things are true, whatever may be said by preconceived ideas apart from facts.

The principles of inductive metrology are not to be judged by their least certain application to the ruder and non-historic remains, of which we have looked at a few examples; but by their results when applied to the works of people whose history and measures are not open to such doubts and uncertainties. There, as far as researches have gone, the conclusions are closely in accord with what is already known, though many important and interesting facts have also appeared; such as the much wider extension of the use of the various ancient cubits and feet, beyond what is historically recorded; the recovery of many measures altogether lost in history; and the identity of some measures in countries between which no such connection was expected. For the details of these researches, and for full particulars of the working methods of examination, and of the application of probable error to all such numerical results, I can only refer to the published essay, "Inductive Metrology," in which I have stated the subject, in order to obtain the opinions and guidance of those versed in such inquiries.

I will only add that there are two important requirements connected with this subject, which can only be forwarded by such an institution as this: first, to urge on travellers to make accurate measurements of all regular and symmetrical remains which they describe—a dozen accurate measurements, of only two or three feet long, are worth more than any rough pacings and guesses at general dimensions; secondly, to organize some plan of ensuring the accurate survey of remains in England, especially such as are in danger of destruction, or are already slightly ploughed over. The remarkable details that are brought to light by careful survey of these works will sufficiently recommend the necessity of rescuing them by recording their forms, even where their unimposing nature may deprive them of the legal protection now recognised as necessary for the principal remains of this country.

Discussion.

Mr. Tylor said that, on reading Mr. Petrie's work, he had suggested to him the desirability of bringing his method and results before the Anthropological Institute. The introduction of the exact method of mathematical comparison into the study of culture was in his opinion a step of much importance. Mr. Petrie's method of ascertaining the standard measures in use in any country by taking dimensions of structures as probably multiples in round numbers

of the unit, is based on that of Newton in his "Dissertation on Cubits," but makes an advance upon it by subjecting the probable errors of measurement, &c., to calculation according to the theory of probabilities. Mr. Tylor hoped Mr. Petrie's results would be subjected to careful criticism, as if found correct they would afford great help in tracing the lines by which civilization has travelled. To students of barbaric culture, Mr. Petrie's attempt in his book to prove the existence among the mound-builders of North America of a unit closely approaching a measure used in the Old World deserved careful consideration. With reference to the elliptic enclosure described by Mr. Petrie, Mr. Tylor thought the evidence tending against the notion of its having been drawn with a line from two set foci, and that the elongation or diminishing of the ordinates of a smaller or larger circle was rather more likely.

On the GAME *of* PATOLLI *in* ANCIENT MEXICO, *and its* PROBABLY ASIATIC ORIGIN. By E. B. TYLOR, Esq. D.C.L., F.R.S.

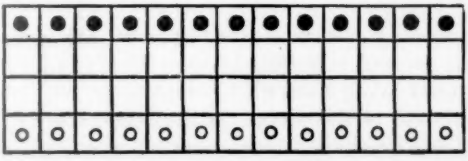
THE group of games to which our *backgammon* belongs is ancient and widely spread over the world. In it a number of pieces are moved on a diagram or board, not at the player's free choice as in draughts or chess, but conformably to the throws of lots or dice. One can hardly doubt, from the peculiar combination of chance and skill here involved, that all the games coming under this definition must be sprung from one original game, though this cannot now be clearly identified, and may indeed have disappeared many ages since. The closeness of correspondence between the abacus or reckoning-board with its little stones or calculi moved on its lines or spaces, and the board and pieces for ancient backgammon, which were even called by the same names, strongly suggests the idea that the original backgammon arose out of the sportive use of the calculating-board. Its descendants, the backgammon family, fall into two groups of games: those played with numbered dice, and those played with two-faced lots which can only fall in two ways, as we say "head or tail." These two groups of games may be conveniently called *dice-backgammon* and *lot-backgammon*. Dice-backgammon makes its appearance plainly in classic history. The game of the "twelve lines" (*duodecim scripta*) was played throughout the Roman Empire, and passed on with little change through mediæval Europe, carrying its name of *tabulæ, tables*; its modern representatives being French *trictrac*, English *backgammon*, &c. Among ancient Greek games, the *kubeia* or "dice-playing" is shown by various classical passages to have been of the nature of backgammon. It appears from Plutarch that in early times

it was played in Persia, where it still flourishes under the name of *nard*. There are also in Sanskrit literature mentions of related games in ancient India. For the purpose of the present paper, however, it will not be needful to go at length into the history of dice-backgammon. It is with the less familiar lot-backgammon that we are principally concerned. This, there is fair reason to believe, was the earlier, as it is the ruder form; dice-backgammon being a later improvement. That such is the case is made likely by the following descriptions of lot-backgammon, which show how clumsily the throwing of a whole handful of lots accomplishes what is done easily with one or two numbered dice.

One variety of lot-backgammon is to this day popular in Egypt and Palestine, under the name of *tab* or "game." It is described in Lane's *Modern Egyptians*, and in Hyde's *De Ludis Orientalibus*, part ii, p. 217. The lots thrown are tab-sticks, four slips of palm-branch about a span long, cut smooth on one side so as to be white, while the other side is left green, these sides being called the white and black respectively. The tab-sticks are thrown against a wall or stick, and the throw counts according to how many white sides come uppermost, thus:—

Whites up,	none,	one,	two,	three,	four,
Count	6	1	2	3	4
	(go on)	(go on,)	(stop)	(stop)	(go on).

Here there is an evident attempt to fix the values of the throws according to the probability of their occurrence, though this is very crudely carried out. Not only do the rarer throws of none-up and four-up score high, but they and one-up (tab) give the player a new throw, whereas the common throws of two-up and three-up lose the lead. This principle runs through all varieties of lot-backgammon. If, as is probable, such lot-scoring represents the earlier form from which dice-scoring is derived, then the privilege of a new turn being given to the extreme throws is the origin of the same privilege being given to doubles in our backgammon. Next as to the tab-board. This is divided into four rows of squares, each row having 7, 9, 11, 13, or other odd number of squares or "houses," thus:—



Rows of holes on a flat stone or on the ground will serve, and the pieces or "dogs" are bits of stone for one side and red brick

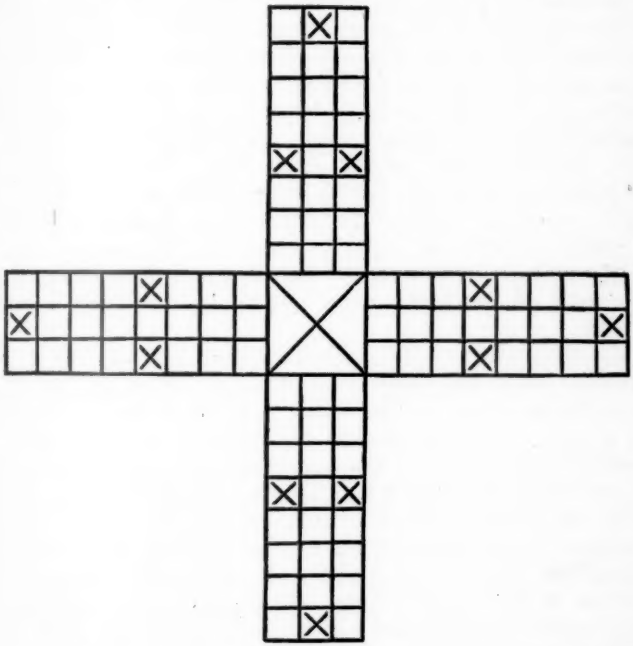
for the other, the players starting by putting a piece in each square on his own side as shown in the figure. Now a "dog" or draught can only be moved from its original square by a throw of tab (one-up). While still inert in its original place the draught is called a Nasara or Christian, but by the throw of tab it is made a Moslem, and can go out to fight. Suppose a player at the beginning throws tab, then four, and then two, he uses the first to bring forward his right-hand draught to the square in front, then moves it on six squares to the left, and then, his last throw having lost the lead, the other player takes his turn. When a throw enables a draught to be moved to a square occupied by one of the enemy's draughts, this is taken, but a square occupied by several draughts is safe. That is to say, our familiar rule of taking a man or hitting a blot belongs to lot-backgammon. The game is ended by one player losing all his men. It remains to be pointed out that the lot-throwing part of the game is sometimes played by itself. The player who throws four is called Sultan, and he who throws six receives the title of Wezir, while the unlucky thrower of two or three gets blows on the soles of his feet.

We now turn to the kind of lot-backgammon played in India, and now generally known under the name of *pachisi*. It is a popular mode of gambling in India, and even Europeans have been known to catch the enthusiasm of the natives, as witness the well-known story of that English official who, having paid his servants' wages, would sit down with them to a match at *pachisi* and sometimes win his money back. At the time of reading this paper, the best account of the game accessible to me was that in Herklot's *Qanoon-e-Islam*, but Mr. Arthur Grote has since kindly procured, through Dr. Rajendralala Mitra, of the Calcutta University, a more complete and consistent set of rules, which are here followed. The game may be played by two, three, or four persons severally, or by two pairs, the partners sitting opposite one another. A cloth, with coloured patches on it, to form the pattern or diagram, is generally used as a board, zealous players often carrying one rolled round in their turbans. The diagram or board is as shown in the illustration.

Each of the four arms contains 24 squares, of which the three crossed squares are called forts (*chik*). The pieces played with (*got*) are usually of turned wood or ivory, of a conoidal shape, much like our present rifle-bullets, and in sets of four, each of the four players having a set all of one colour, red, green, yellow, black. The moves of the pieces on the board are determined by the throws of cowrie-shells, which count according to how many fall mouth upward. The scoring is as follows when six cowries are used :—

Mouths up,	none,	one,	two,	three,	four,	five,	six.
Count,	6	10	2	3	4	25	12
	(go on)		(stop)			(go on).	

Suppose now four players to be seated, each at the end of one cross-arm. The object of each player is to move his men



from home down the middle row of his own arm, and then along the outside lines of squares from right to left (against the sun) till having made the circuit of the whole board, they come back to the end of their own arm, move up its middle row where they came down, and get back into the central space or home, the winner being he who gets his four men round first. The pieces move onward as many squares as the score of the throw. But a piece can only be started in the game when its owner throws a 10 (*das*) or a 25 (*pachisi*), which throws give a starting 1 (*puá*) in addition to the ordinary score, by which 1 a-piece is put on the first square and so started on its course. The high throws 6, 10, 12, 25, entitle the player to a new throw as doublets do in our backgammon, but at the lower throws the lead passes to the other player. Thus when the game begins, the throws are

useless till one player throws 10 or 25; suppose he throws 10, and this giving him a new throw, afterwards 2, he is able to start a piece on the first square, and then move it 10 and 2 squares onward. A single man on a square is taken by an enemy's man moving on to that square, and the taken man being dead (*marâ*) is put back in the home to start afresh, but two or more men of one set on a square hold it safely, all which is as in our backgammon. In *pachisi*, however, taking or cutting (*kátá*) a man gives the player a new throw. Also in *pachisi*, the crossed squares or forts are places where a single man is in safety, and even blocks an enemy's man from moving there. The throws just mentioned, 10 followed by 2, are favourable as entering a man and putting him in safety in a fort; a 25 followed by a 4 is good in the same way. When a piece, after making the circuit of the board, comes back to go up its own middle row, it is called ripe (*pakká*) and is laid on its side to distinguish it from the starting-pieces on their way down. If the ripe piece gets again on the last square before home, it can only be got off the board as it got on, by a throw of *das* or *pachisi*.*

The comparison of this Hindu game of *pachisi* shows close connection with the Arab tab; we have even the privileged throws giving a new throw, and a particular throw required to start a man. In India there is also played another game like *pachisi* except that the cowries are superseded by a kind of long dice, numbered on the four long sides but not at the ends; as thus played the game is called *chúpur*. The *pachisi* board has been introduced into England, with four sets of four small draughts as the pieces, and ordinary dice. In this state the game has made its nearest approach to our backgammon, and any one who tries the set of games will be likely to admit that in the *pachisi* played with cowries as lots, he has before him an early and rude stage of the game as lot-backgammon, out of which it passed into dice-backgammon. He may also be

* Further details. If 25, 10, or 12 are thrown thrice running, they are called rotten (*pachá*) and destroy one another, but a new throw of 10 or 25 may restore them, and so with six consecutive throws, restored by a seventh. In going home up the middle row, a player cannot use a throw for which there are not sufficient squares left. When players are in partnership, their pieces can be in the same squares. A partner whose pieces are all home can throw on his partner's behalf, after getting a new starting 1. He may also make a ripe man on its way home into an unripe one, for the purpose of cutting off an enemy's man, or revive and bring out again a piece which has got home. Sometimes a player having two pieces on one square moves them as a couple (jora) which can take an enemy's couple. Such couples can move at option to the 12th or 25th square with a throw of 25 or to the 5th or 10th square with a throw of 10, but uneven throws other than 25 disjoin the couple. This system of couples (which is allied to the plan of joining pieces in the Arab tab) is said not to be recognized by good *pachisi* players.

disposed to think that our own dice-backgammon, though tolerably ancient, came into existence by a similar course of development. It should be added that both as played with cowries and dice, games like *pachisi* are ancient in India. Having looked into the Sanskrit references and consulted Professor Jolly, of Würzburg, I am inclined to think that a game called *panchikâ*, played with five cowries, may represent one of its earliest forms, for the name of *pachisi*, meaning "five-and-twenty," is clearly derived from the scoring of the throw of five cowries. Leaving this for further examination, it will be sufficient to have given an idea of the nature of the Hindu *pachisi*, for it is to this game that a variety of lot-backgammon appearing in Old Mexico will now be seen to present the most striking analogy.

Among the accounts of this Mexican game given by the Spanish chroniclers the earliest is that by Gomara, whose history was printed in 1552, so that his account must have been written while the conquest in 1521 was still fresh in memory. He writes as follows: "Sometimes Montezuma looked on as they played at *patoliztli*, which much resembles the game of tables and is played with beans marked like one-faced dice, which (beans) they call *patolli*, which they take between the hands and throw on a mat, or on the ground, where there are certain lines like a merrel (or draught) board, on which they mark with stones the point which fell up, taking off or putting on a little stone."* Torquemada, partly following this account, gives more details, showing the diagram played on to have been of the shape of a *pachisi* board, and the players to have had men of different colours. He says that "they call it the game of *patolli*, because these dice are called so; they throw them with both hands on a thin mat . . . . on which are made certain lines after the manner of a + cross and others crossing them marking the point falling up (as at dice) taking off or putting on little stones of different colour, as in the game of tables."†

* Francisco Lopez de Gomara, "La istoria de las Indias, y conquista de Mexico" [Saragossa] 1552, fol. 42. "Algunas vezes mirauia Moteççuma como jugauan al Patoliztli, que parece mucho al juego de las tablas. Y que se juega con hauas, o frisoles raiados como dados de harinillas que dizen Patolli. Los quales menean entre ambas manos. Y los echan sobre una estera, o en el suelo, donde ay ciertas raias, como alquerque, en que señalan con piedras el punto que cayo arriba, quitando, o poniendo china."

† Juan de Torquemada, Monarquia Indiana, Seville 1615, Book xiv., c. 12. "Auia otro juego que llaman Patolli, que en algo parece al juego de las tablas reales, y juegase con hauas y frisoles, hechos puntos en ellos, a manera de dados de arenillas, y dizenle juego Patolli, porque estos dados se llaman assi; echanlos con ambas manos sobre una estera delgada que se llama petate, hechas ciertas rayas a manera de aspa y atrauessando otras señalando el punto que cayò hazia arriba (como se haze en los dados) quitando, o poniendo chinas de diferente color, como en el juego de las tablas." The word "aspa" means an equal-armed cross, the

Next come the particulars given by Sahagun, which though not adding much to our knowledge of the game, explain why it ceased to be played some time after the conquest. "The lords for their pastime also played a game called *patolli*, which is as the game of merells (or draughts) or the like, or dice-playing, and there are four large beans, each having a hole, and they throw them with the hand, as one plays at knuckle-bones, on a mat where there is a figure drawn. At this game they used to play and win precious things, such as gold beads and precious stones, very fine turquoises. This game and that of ball they have left off, being suspicious on account of some idolatrous superstitions in them." In another place he says: "The second pastime they had was a game like dice; they made on a mat a painted cross, full of squares like the game of draughts, and sitting down on the mat, they took three large beans with certain points made in them, and let them fall on the painted cross, &c.*

At the reading of my paper, I was only able to refer to the work of Diego Duran as cited in Bancroft's *Native States of the Pacific*, vol. ii, p. 300. The part of his work containing the account of *patolli* is still in MS., but there is a transcript in the Bancroft Library at San Francisco, from which Mr. Oak, the librarian, has since kindly furnished me with an extract. The game they played on the mat (says Duran) they called *patolly*, which is the same name we now give to cards. On this mat they had a great cross painted taking the mat from corner to corner. Within the hollow of the cross were certain transverse lines forming houses or squares, which cross and squares were marked and drawn in lines with liquid ulli (indiarubber). For these squares there were twelve small stones, six red and six blue, which they divided between the players, to each so many. If two played, which was the ordinary way, one took six and the other the other six. The dice were certain black beans, five or ten

arms of a windmill, &c.; "arenillas" are dice with points only on one face or side, they are numbered from one to six.

* Fr. Bernardino de Sahagun, "Historia Universal de las Cosas de Nueva España," printed in Lord Kingsborough's "Antiquities of Mexico," vol. vii., book viii., c. 10. "Tambien los Señores por su pasatiempo jugaban un juego que se llama Patolli, que es como el juego del castro ó alquerque ó casi, ó como el juego de los dados; y son quatro frisoles grandes que cada uno tiene un agujero, y arrojanlos con la mano, sobre un petate como quien juega a los carnicoles donde está hecha una figura. A este juego solian jugar y ganarse cosas preciosas, como cuentas de oro y piedras preciosas, turquesas muy finas. Este juego y el de la pelota hanlo dejado, por ser sospechosos de algunas superstitiones idolatricas que en ellos hay," c. 17. "El segundo pasatiempo que tenian era un juego como dados; hacien en un petate una cruz pintada, llena de cuadros semejantes al juego del alquerque o castro, y puestos sobre el petate sentados, tomaban tres frisoles grandes, hechos ciertos puntos en ellos, y dejabanlos caer sobre la cruz pintada, y de alli tenian su juego;" &c.

or as they chose to lose or gain, which had certain white holes in each bean where they marked the number of squares which were gained on each hand; where five were marked they were ten, and ten twenty; and if one, one; and if two, two; and if three, three; and if four, four; but marking five they were ten, and if ten, twenty; and so those little white dots were lots and markers of the lines that were gained, and for shifting the stones from square to square. Duran goes on to describe (as the other authors do) the eagerness with which the Mexicans played at this game; how gamesters went about with the mat and stones in a little basket under their arms; how they spoke to them as though they were things with sense and intelligence; and having talked to them with a thousand loving words and requests, would set up the little baskets with the instruments of the game and the painted mat, and bringing fire would throw into it incense and sacrifice before those instruments, bringing offerings of food. Having finished the offering and ceremonies they went off to play with all the confidence in the world. The author continues, that the name of the god of the dice was Macuilxochitl, which means Five roses (five flowers would have been more correct). Him the players invoked as they threw the beans from the hand, which was in the following manner: That the beans serving as dice are five in honour of that god named Five Roses, and to throw the lot they keep rubbing them a while between their hands, and on throwing them on the mat where there is the figure of the fortune and its counting which is in the manner of two clubs, they called with a loud voice on Macuilxochitl and gave a great clap, and then looked to see the points that had come, and this Macuilxochitl was only for this game of the dice. It seems, however, that they would also sometimes call on the god of gambling, Ometochtli, to give them a good point, &c.*

* Diego Duran, "Hist. Indias," MS., tom. iii., cap. xxii. . . . . al juego que sobre esta estera jugaban llamaban "patolly," que es el mismo vocablo que ahora llamamos naypes. Sobre esta estera tenian pintada una aspa grande la que tomaba el petate de esquina á esquina. Dentro del hueco de la aspa habia atravesadas unas rayas que servian de casas, la cual aspa y casas estaban señaladas y rayadas con ulli derretido . . . para estas casas habia doce piedras pequeñas las seis coloradas y las seis azules, las cuales pedrezuelas partian entre los que jugaban á tantas á cada cual: si jugaban dos que era lo ordinario tomaba el uno las seis y el otro las otras seis; y aunque jugaban muchos jugaba uno por todos ateniendose á la suerte de aquel, como entre los Españoles se juegan los albures ateniendose á la mejor suerte, así se atenian acá al que mejor meneaba los dados, los cuales eran unos frisoles negros cinco ó diez ó como querian perder ó ganar, los cuales tenian unos ahugerillos (*sic*) blancos en cada frisol por donde pintaban el numero de las casas que se aventajaban en cada mano, donde se pintaban cinco eran diez y diez veinte, y si uno, uno, y si dos, dos, y si tres, tres, y si cuatro, cuatro; pero pintando cinco eran diez, y si diez veinte, y así aquellas pintillas blancas eran suertes y cuenta de las rayas que se ganaban; y darmua pars la

These accounts of *patolli* are the only ones to be trusted, the newer ones being hardly to the point, except where they are following the old authorities. Clavigero repeats what he has read, adding that "he who first got three stones in a row, won."* But this may only be an amplification of his predecessors' comparison of the game to alquerque, which seems to have been like our merells, where counters are moved on a diagram with the object of getting three in a line, whence it is also called in Spanish "tres en raya," or "three in a row." Again, Brasseur says that he who returned first into the squares won the game.† Probably it was so, but this author in stating it may only have gone upon the earlier statement that the game was played like tables.

Putting all this together, it is plain that the Spanish chroniclers were right in comparing *patolli* to their own game of tables or backgammon, but had they been acquainted with *pachisi*, they would doubtless have pointed out the closer connection of *patolli* with this Indian game. The playing backgammon-fashion with coloured stones as counters, on a diagram like a cross, full of squares, on which the moves were made by counting squares according to the throws of marked lots, in scoring which a disproportionate advantage was given to the high throws, all corresponds to *pachisi*. And where the beans

piedras de unas casas en otras . . . Andaban los taures de este juego siempre con la estera debajo del sobaco, y con los dados atados á un pañito como algunos taures de este tiempo, que siempre andan apercibidos con los naypes en las calzas de tablage en tablage; aquellos dados juntam^te^ con las piedrezuelas del juego traian en una bascrita (*sic*) pequeña á los cuales hacian reverencia como á Dioses fingiendo en ellos haber alguna virtud, y asi les hablaban cuando jugaban como á cosa que tubiese algun sentido ó inteligencia de lo que le pedian . . . . asi estos naturales hablaban á los frisolillos y al petate y decian mil palabras de amor y mil requiebros y mil superstiticiones, y despues de haberles hablado ponian las petaquillas en el lugar de adoracion con los instrumentos del juego y la estera pintada junto á ella y traia lumbre y echaba en la lumbre incienso y ofrecia su sacrificio ante aquellos instrumentos ofreciendo comida delante de ellos. Acabada la ofrenda y ceremonias ivan á jugar con toda la confianza del mundo."

"El nombre del Dios de los dados era Macuilxuchitl, que quiere decir cinco rosas: á este invocaban los jugadores cuando arrojaban los frisoles de la mano, lo cual era á la manera que dire; que los frisolillos que sirven como de dados son cinco á honra de aquel Dios que tiene nombre de cinco rosas; y para echar la suerte traenlos un rato refregándolos entre las manos, y al lanzallos sobre la estera donde está la figura de la fortuna y cuenta suya que es á la manera de dos bastos, llamaban á alta voz á Macuilxuchitl, y daban una gran palmada, y luego acudia á ver los puntos que le habian entrado; y este Macuilxuchitl era solamente para este huego de los dados."

". . . invocaban á este Dios cuando jugaban, diciendo 'el Dios Ometochtly me de buen punto,'" &c.

* Clavigero, "Storia Antica del Messico," Cesena, 1780, vol. ii., p. 185, "e chi prima aveva tre pietruzze in fila, quegli vinceva."

† Brasseur de Bourbourg, "Histoire des Nations Civilisées du Mexique et de l'Amérique Centrale," Paris, 1858, vol. iii., p. 671, "et celui qui retournait le premier dans les cases gagnait la partie."

used as lots at *patolli* seem to have been sometimes only marked on one side to distinguish them from the other in head-and-tail fashion, while sometimes they were numbered; this matches with the two ways of playing the Hindu game, with cowries as two-faced lots, or with the numbered stick-dice. It seems so clear that the Mexican game must have come from Asia, that the question first arises—Could any Spanish or Portuguese sailor have learnt it in the East Indies, and then on a voyage to the West Indies have been, perhaps, wrecked on the Mexican coast, and taught his new acquisition to the natives? But the dates do not allow room for this supposition.

Vasco de Gama's voyage to India was about 1500, and the conquest of Mexico was in 1521. It is by earlier direct communication from Asia that we must explain the presence of *patolli* in Mexico. That such communication took place has been proved by Alexander von Humboldt's well-known argument from the occurrence in Mexico of a chronological calendar in which signs were combined to date days, years, &c., on a complex perverse principle closely resembling that on which the Tibetans, Chinese, &c., still reckon dates. Not only were the signs, tiger, dog, ape, hare, &c., used to date periods of time both by these nations and the ancient Mexicans, but they combine such signs in series, so that as in Japan "younger Fire Hare" denotes the fourth year of the cycle, so in Mexico "two Hare Fire" stands for the 28th day of a year. The correspondence between the myths of successive destructions of the world in Asia and Mexico is hardly less remarkable. The same causes which brought Asiatic calendars and myths into Aztec culture, may have brought over the Indian game of *pachisi*. It is not needful to account for this connection between nations of the two continents by supposing migrations of population on a large scale. The necessary contact might even have been made by the drifting over of boats or junks, with the crews alive, from East Asia to the Pacific coast of North America: an event which happens every now and then, as it probably has done for ages. By whatever communication Asiatic calendars and cosmic myths found their way into America, the Hindu game of *pachisi* or some allied form of it may have passed over from somewhere in Asia, and established itself in Mexico as *patolli*.

The evidence derived from this game, however, by no means ends here. Father Joseph Ochs, a Jesuit missionary who was in Mexico in 1754–68, in the following passage is no doubt speaking of the natives in the Tarahumara and Pima district. "Instead of our cards they have slips of reed or bits of wood, a thumb wide and almost a span long, on which, as on a tally, different strokes are cut in and stained black. These they hold

together tight in the hand, raise them as high as they can, and let them fall on the ground. Whoever then has most strokes or eyes for him, wins the stakes. This game is as bad as the notorious hazard. They call it *patole*. As it is forbidden under pain of blows, they choose a place out in the woods, yet the noise of these bits of wood has discovered me many sharpers hidden in the bush. To play the more safely they spread out a cloak or carpet, not to be betrayed by the noise."* Thus toward a thousand miles from the city of Mexico, we find a game going on which still keeps the Aztec name of *patolli*, although the language of the district is not Aztec, and which seems to be the Mexican game so far as the casting lots are concerned, but without the counters. The use of slips of wood as lots is curiously like the Egyptian *táb*, which game also, it was noticed, is sometimes played without the counters, though only for sport, not gambling.

If now we travel another thousand miles and more north-eastward, into the region of the great lakes, we shall find among the so-called North American Indians a game which on examination appears closely connected with the Mexican *patolli*. It is widely spread, and has been mentioned by many authors as the game of plum-stones, game of the bowl, &c. It was clearly not derived from the Europeans, and is noticed as a regular Indian game by the Jesuit missionaries among the Hurons as early as 1636;† they call it *jeu de plat*, and say it was played with six plum-stones, white on one side and black on the other, in a dish which was hit hard against the ground so that the stones turned over anyhow, the game being to get them all black or all white. They clearly did not quite understand the game, of which the best account is that given by Mr. L. H. Morgan, as played among the Iroquois.‡ It appears in two forms. As *gus-ga-e-sá-tă*, or deer buttons, it was strictly a fireside game,

* Murr, "Nachrichten von verschiedenen Ländern des Spanischen Amerika," Halle, 1809, part i., p. 256. "Anstatt unserer Karten haben sie daumenbreite, fast spannenlange Rohrschnitze, oder auch Hölzergen, in welche, wie auf einem Kerbholze, verschiedene Striche eingeschnitten und schwarz getränkt sind. Diese halten sie in der Hand fest zusammen, heben sie so hoch sie können in die Höhe, und lassen sie auf die Erde fallen. Wer denn mehrere Striche oder Augen über sich hat, gewinnt den Einsatz. Dies Spiel ist so schlimm, als das verruchte Würfelspiel. Sie nennen es Patole. Weil es bey Strafe der Schläge verboten ist so ersehen sie sich hiezu einen Ort im Gebüsche aus; jedoch hat mir der Klang dieser Hölzerchen manche im Gebüsche versteckte Gauner entdeckt. Sicherer zu spielen breiteten sie einen Mantel oder Teppich aus, um nicht durch den Schall verrathen zu werden," &c.

† "Relations des Jesuites dans la Nouvelle France" (reprinted Quebec, 1858), 1636, p. 113. See also Loskiel "History of Mission of United Brethren among the Indians in North America," translated by Latrobe, London 1794, part i., p. 106.

‡ L. H. Morgan, "League of the Iroquois," Rochester (N.Y.), 1851, p. 302-307.

though sometimes introduced as an amusement at the season of religious councils, the people dividing into tribes as usual and betting upon the result. Eight buttons, about an inch in diameter, shaped like a double-convex lens, were made of elk-horn, rounded and polished, and slightly burned on one side to blacken them. The game was played by two or more, all the players continuing in their seats till it was determined. A certain number of beans, fifty perhaps, were made the capital, and the game continued until one of the players had won them all. Two persons spread a blanket, and seated themselves upon it. One of them shook the deer buttons in his hands, and then threw them down. If 6 turned up of the same colour, it counted 2, if 7, it counted 4, and if all, it counted 20, the winner taking as many beans from the general stock as he made points by the throw. He also continued to throw as long as he continued to win. When less than 6 came up, either black or white, it counted nothing, and the throw passed to the other player. In this manner the game was continued until the beans were taken up between the two players. After that the one paid to the other out of his own winnings, the game ending as soon as either player's beans were all lost. Or four could play, either with a partner or independently. When deer buttons was played as a public game, the arrangement was as in the peach-stone game.

The peach-stone game, *gus-kä-eh*, was a betting game, played by the people divided into tribes, and by custom it was the concluding exercise on the last day of the Green Corn and Harvest Festivals, and also of the New Year's Jubilee. Its introduction among them is ascribed to the first *To-do-dä-ho*, who flourished at the formation of the "League," and a popular belief prevailed that it would be enjoyed by them in the future life, in the realm of the Great Spirit. It was played in the public council-house, by a succession of players, two at a time, under the supervision of managers. A number of beans, usually 100, made the bank. When the bets had been made, and the articles staked delivered into the custody of the managers, these seated themselves on a raised platform, the throng arranged themselves in two divisions, and two players sat down to play, one on each side, each provided by the managers on his own side with five beans out of the bank. Six peach-stones were used, ground or cut down to the flattened roundish form required, and burnt on one side to blacken them. They were put in a wooden or earthen bowl and shaken by the player. When they ceased rolling, if all came up of one colour, white or black, it counted 5, entitling the player to receive 5 beans from his adversary; if 5 came up of one colour, it counted 1, giving 1 bean; if less than 5 of either

colour came up, it counted nothing, and the lead passed to the opponent. When either player had lost all his stock of beans, he retired, and a new player with a new stock replaced him, till one side had gained all the beans, thus winning the game.

This using of beans as counters may possibly have been learnt by the Indians from the white men, so that we must not found any ethnological argument on it, nor can we with safety treat as properly belonging to the Indian tribes of America the varieties of the game which are described in Schoolcraft's "Indian Tribes," Part II., p. 71, as played by the Dacotas under the name of *kun-ta-soo*, and by the Ojibwas as *puggesaing*. The Dakota game is played with eight plum-stones, but some of them are marked with figures of tortoise, war-eagle, &c., and the counting is elaborate. The Ojibwa name is well known to English readers from Longfellow having embodied in his "Hiawatha" a long description of it from Schoolcraft, under the title of "the game of bowl and counters, puggesaing with thirteen pieces." It has in it brass discs and pieces of bone cut to represent ducks, war-clubs, &c, and these all have a right and wrong side, the reckoning of the combinations thrown ranging from nothing up to 158 for a single throw, in a most complicated way. Now though modern Indians have played these games, there are no early mentions of them, as there is of the simple game of the bowl and plumstones. It is therefore quite likely that these more complex games may be modern varieties of the old American game of the bowl, made with European help.

To sum up the argument from the presence of these games in America. Lot-backgammon as represented by tab, *pachisi*, &c., ranges in the Old World from Egypt across Southern Asia to Birma. As the *patolli* of the Mexicans is a variety of lot-backgammon most nearly approaching the Hindu *pachisi*, and perhaps like it passing into the stage of dice-backgammon, its presence seems to prove that it had made its way across from Asia. How it came is uncertain, though the drifting across of Asiatic vessels to California offers the readiest solution. At any rate, it may be reckoned among elements of Asiatic culture traceable in the old Mexican civilization, the high development of which in metal work, architecture, astronomy, political and religious institutions, &c., seems to be in large measure due to Asiatic influence. From Mexico, it appears that gambling by means of lots spread among the ruder north-west tribes, bearing the Aztec name of *patolli*, and being in fact the lot-casting part of that game but without the board and stone counters. Moreover, similar gambling by lot-casting was early found among the tribes of the great American lakes. This method of lot-casting, which corresponds to that of lot-backgammon, was certainly not

introduced into America by the Europeans, who were not acquainted with it. We are therefore left to consider that the North American Indians got it probably through Mexico, but at any rate in some manner from Asia. Now if any item of culture, even a matter so trifling as a game, can be distinctly made out to have passed over from Asia and established itself among the rude tribes of North America, this opens a way by which various other features of their culture may be fairly accounted for as due to Asiatic influence.

Discussion.

Lieut. Col. Godwin Austen said: I have listened with very great interest to Mr. Tylor's paper on the striking similarity of the old Mexican game of "*patolli*" with the common Indian game called "*pachisi*." I became acquainted with this last when employed on the survey of Kashmir some years ago. It was the favourite game of the natives of my establishment, and this led me to learn the game, which I often played with them, and I became then well acquainted with the rules. Knowing that Mr. Tylor was writing on the subject, I have put a few notes and the rules together of the game as played by the Kashmiris, Punjabis, &c.

The game is well known all along the northern part of India to Assam. I do not know whether it extends to Burma, but very probably is known there, from the larger Hindustani element now in the country. I can, I think, clear up the meaning and similarity of one of the statements regarding the Mexican game so described by the old Historian (Clavigero) who very probably did not thoroughly know the game of *patolli*, and described it as a looker-on would do, and as most Europeans in India would now if explaining the game of *pachisi* He says the game ends when three of the coloured pieces are *all in a row*. Now in the game of *pachisi*, played with four sets of three-coloured markers, "Gúti", as they are played out they are placed in a row within the centre square or goal, and opposite to the player's own arm of the cross-board, and this position shows plainly to those engaged how many each individual has played out round the table; the first to place them all in a row being the winner, the others in succession.

Rules of the Game of Pachisi.

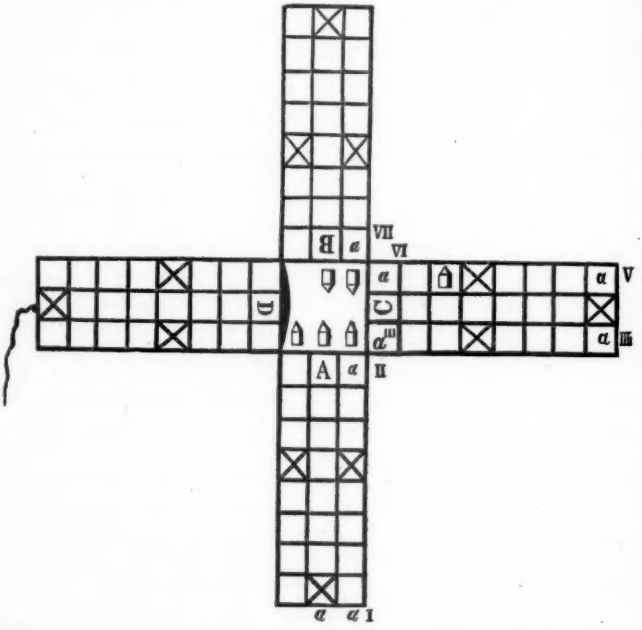
The game is played by two, three, or four persons (A B C D) having three markers (Gúti) or counters of different colours each (to shorten the game only two are often agreed on to be played), these are moved over the squares of the board, commencing at A to a′, a″, a‴, &c. Certain squares are marked with diagonal lines; in these a marker is safe and cannot be taken up; the term for this is "*Gúché baithna*,"—*Gúché* being probably a corruption of *Gosha*, used in the sense of "*Gosha Nishin*"—a hermit.

2. The moves are regulated by the throw of seven cowries in different combinations.

A cowrie falling with the aperture uppermost is called "*chit*," with the aperture down or flat, "*put*."

The highest throw, "*pachis*," gives the name to the game —is	=	25
Six cowries with aperture up, one down—		
The next highest all seven cowries with aperture upwards	=	12
All seven with aperture down	=	6
All down and one up	=	1
All down and two up	=	2
All down and three up	=	3

and so on up to five.



The Board is made of Cloth, with a pocket at D to hold the markers. It then folds up and is tied by a string. The markers are made of wood coloured with lac worked in on a lathe.

3. A throw of twenty-five, twelve, or six must be made to enable a player to come in. Place the first marker on the board and commence play, and so for each marker, this is called *pauwa*—or getting an ace; a throw of the above numbers gives an extra throw.

4. On playing out, should the marker get into the last square a throw of twenty-five, twelve, or six must be made to take it off the board.

5. Markers are taken up "*guti marna.*" when by the throw of the cowries a marker can be placed in a square already occupied by an adversary—who then has to commence again from his original side of the board.

It will be seen from the construction of the board that from one corner square to the opposite and inner corner square is 25, or from a′ a i. to a‴ a vii.

Mr. Hyde Clarke suggested to Mr. Tylor that the Tarahumara language possesses elements independent of its Aztek affinities, and that, too, it is related to remarkable languages of the Old World. He considered the discovery of Mr. Tylor's had another important link in the connection between the Old World and the New, and could not concur with him in attributing the calendar, the creation legend and the attoli, and he would add the measurements of Mr. Petrie, and so many other proofs of connection, to the casual influence of Chinese and Japanese wrecks before the time of Monteruma. He attributed them to specific migration, of which they had now so much evidence.

Mr. Walhouse, Capt. Dillon, and the President took part in the above discussion, and Mr. Tylor replied.

April 30th, 1878.

Major-General A. Lane Fox, F.R.S., *Vice-President, in the Chair.*

The minutes of the previous meeting were read and confirmed.

The following presents were announced, and thanks were ordered to be returned to the respective donors for the same.

For the Library.

From the Society.—Proceedings of the Royal Society. Vol. XXVII, No. 186.

From the Society.—Mémoires de la Société Impériale des Amis d'histoire naturelle, d'Anthropologie et d'Ethnographie. Vol. XXIX.

From the Society.—Bulletin de la Société d'Anthropologie de Paris. Tome XII, No. 4.

From the EDITOR.—Revue Scientifique. No. 41–43, 1878.
From the SOCIETY.—Proceedings of the Society of Antiquaries of London. Vol. VII, No. 3.
From the EDITOR.—Revue Internationale des Sciences. No. 15–17, 1878.
From the ACADEMY.—Atti della R. Academia. Vol. II, No. 4.
From the EDITOR.—"Nature" to date.

The following paper was read by the Author:—

COMPOSITE PORTRAITS, *made by combining those of many different persons into a single resultant figure.* By FRANCIS GALTON, F.R.S.

I submit to the Anthropological Institute my first results in carrying out a process that I suggested last August in my presidential address to the Anthropological Subsection of the British Association at Plymouth, in the following words:—

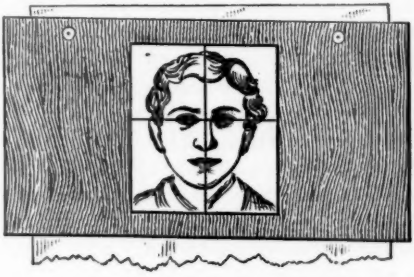
"Having obtained drawings or photographs of several persons alike in most respects, but differing in minor details, what sure method is there of extracting the typical characteristics from them? I may mention a plan which had occurred both to Mr. Herbert Spencer and myself, the principle of which is to superimpose optically the various drawings, and to accept the aggregate result. Mr. Spencer suggested to me in conversation that the drawings reduced to the same scale might be traced on separate pieces of transparent paper and secured one upon another, and then held between the eye and the light. I have attempted this with some success. My own idea was to throw faint images of the several portraits, in succession, upon the same sensitised photographic plate. I may add that it is perfectly easy to superimpose optically two portraits by means of a stereoscope, and that a person who is used to handle instruments will find a common double eyeglass fitted with stereoscopic lenses to be almost as effectual and far handier than the boxes sold in shops."

Mr. Spencer, as he informed me had actually devised an instrument, many years ago, for tracing mechanically, longitudinal, transverse, and horizontal sections of heads on transparent paper, intending to superimpose them, and to obtain an average result by transmitted light.

Since my Address was published, I have caused trials to be made, and have found, as a matter of fact, that the photographic process of which I there spoke enables us to obtain with mechanical precision a generalised picture; one that represents no man in particular, but portrays an imaginary figure possessing the

average features of any given group of men. These ideal faces have a surprising air of reality. Nobody who glanced at one of them for the first time, would doubt its being the likeness of a living person, yet, as I have said, it is no such thing; it is the portrait of a type and not of an individual.

I begin by collecting photographs of the persons with whom I propose to deal. They must be similar in attitude and size, but no exactness is necessary in either of these respects. Then, by a simple contrivance, I make two pinholes in each of them, to enable me to hang them up one in front of the other, like a pack of cards, upon the same pair of pins, in such a way that the eyes of all the portraits shall be as nearly as possible superimposed; in which case the remainder of the features will also be superimposed nearly enough. These pinholes correspond to what are technically known to printers as "register marks." They are easily made: A slip of brass or card has an aperture cut out of its middle, and threads are stretched from opposite sides,



making a cross. Two small holes are drilled in the plate, one on either side of the aperture. The slip of brass is laid on the portrait with the aperture over its face. It is turned about until one of the cross threads cuts the pupils of both the eyes, and it is further adjusted until the other thread divides the interval between the pupils in two equal parts. Then it is held firmly, and a prick is made through each of the holes.

The portraits being thus arranged, a photographic camera is directed upon them. Suppose there are eight portraits in the pack, and that under existing circumstances it would require an exposure of eighty seconds to give an exact photographic copy of any one of them. The general principle of proceeding is this, subject in practice to some variation of details, depending on the different brightness of the several portraits. We throw the image of each of the eight portraits in turn upon the same part of the sensitised plate for ten seconds. Thus, portrait No. 1 is in the front of the pack; we take the cap off the object glass of the camera for ten seconds, and afterwards replace it. We then

remove No. 1 from the pins, and No. 2 appears in the front; we take off the cap a second time for ten seconds, and again replace it. Next we remove No. 2 and No. 3 appears in the front,

which we treat as its predecessors, and so we go on to the last of the pack. The sensitised plate will now have had its total exposure of eighty seconds; it is then developed, and the print taken from it is the generalised picture of which I speak. It is a composite of eight component portraits. Those of its outlines are sharpest and darkest that are common to the largest number of the components; the purely individual peculiarities leave little or no visible trace. The latter being necessarily disposed equally on both sides of the average, the outline of the composite is the average of all the components. It is a band and not a fine line, because the outlines of the components are seldom exactly superimposed. The band will be darkest in its middle whenever the component portraits have the same general type of features, and its breadth, or amount of blur, will measure the tendency of the components to deviate from the common type. This is so for the very same reason that the shot-marks on a target are more thickly disposed near the bulls-eye than away from it, and in a greater degree as the marksmen are more skilful. All that has been said of the outlines is equally true as regards the shadows; the result being that the composite represents an averaged figure, whose lineaments have been softly drawn. The eyes come out with appropriate distinctness, owing to the mechanical conditions under which the components were hung.

A composite portrait represents the picture that would rise before the mind's eye of a man who had the gift of pictorial imagination in an exalted degree. But the imaginative power even of the highest artists is far from precise, and is so apt to be biassed by special cases that may have struck their fancies, that no two artists agree in any of their typical forms. The merit of the photographic composite is its mechanical precision, being subject to no errors beyond those incidental to all photographic productions.

I submit several composites made for me by Mr. H. Reynolds. The first set of portraits are those of criminals convicted of murder,

manslaughter, or robbery accompanied with violence. It will be observed that the features of the composites are much better looking than those of the components. The special villainous irregularities in the latter have disappeared, and the common humanity that underlies them has prevailed. They represent, not the criminal, but the man who is liable to fall into crime. All composites are better looking than their components, because the averaged portrait of many persons is free from the irregularities that variously blemish the looks of each of them.

I selected these for my first trials because I happened to possess a large collection of photographs of criminals, through the kindness of Sir Edmund Du Cane, the Director-General of Prisons, for the purpose of investigating criminal types. They were peculiarly adapted to my present purpose, being all made of about the same size, and taken in much the same attitudes. It was while endeavouring to elicit the principal criminal types by methods of optical superimposition of the portraits, such as I had frequently employed with maps and meteorological traces,* that the idea of composite figures first occurred to me.

The other set of composites are made from pairs of components. They are selected to show the extraordinary facility of combining almost any two faces whose proportions are in any way similar.

It will, I am sure, surprise most persons to see how well defined these composites are. When we deal with faces of the same type, the points of similarity far outnumber those of dissimilarity, and there is a much greater resemblance between faces generally, than we who turn our attention to individual differences are apt to appreciate. A traveller on his first arrival among people of a race very different to his own thinks them closely alike, and a Hindu has much difficulty in distinguishing one Englishman from another.

The fairness with which photographic composites represent their components, is shown by six of the specimens. I wished to learn whether the order in which the components were photographed made any material difference in the result, so I had three of the portraits arranged successively in each of their six possible combinations. It will be observed that four at least of the six composites are closely alike. I should say that in each of this set the last of the three components was always allowed a longer exposure than the second, and the second than the first, but it is found better to allow an equal time to all of them.

The stereoscope, as I stated last August in my address at

* "Conference at the Loan Exhibition of Scientific Instruments," 1878. Chapman and Hall. Physical Geography Section, p. 312, "On Means of Combining Various Data in Maps and Diagrams," by Francis Galton, F.R.S.

Plymouth, affords a very easy method of optically superimposing two portraits, and I have much pleasure in quoting the

The accompanying woodcut is as fair a representation of one of the composites as is practicable in ordinary printing. It was photographically transferred to the wood, and the engraver has used his best endeavour to translate the shades into line engraving. This composite is made out of only three components, and its three-fold origin is to be traced in the ears, and in the buttons to the vest. To the best of my judgment the original photograph is a very exact average of its components: not one feature in it appears identical with that of any one of them, but it contains a resemblance to all, and is not more like to one of them than to another. However the judgment of the wood engraver is different. His rendering of the composite has made it exactly like one of its components, which it must be borne in mind he had never seen. It is just as though an artist drawing a child had produced a portrait closely resembling its deceased father, having overlooked an equally strong likeness to its deceased mother, which was apparent to its relatives. This is to me a most striking proof that the composite is a true combination.

following letter, pointing out this fact as well as some other conclusions to which I also had arrived. The letter was kindly forwarded to me by Mr. Darwin; it is dated last November, and was written to him by Mr. A. L. Austin, from New Zealand, thus affording another of the many curious instances of two persons being independently engaged in the same novel inquiry at nearly the same time, and coming to similar results.

"Invercargill, New Zealand,
"*November 6th*, 1877.

"TO CHARLES DARWIN, Esq.

"SIR,—Although a perfect stranger to you, and living on the reverse side of the globe, I have taken the liberty of writing to you on a small discovery I have made in binocular vision in the stereoscope. I find by taking two ordinary carte-de-visite photos of two different persons' faces, the portraits being about the same sizes, and looking about the same direction, and placing them in a stereoscope, the faces blend into one in a most remarkable manner, producing in the case of some ladies' portraits, in every instance, a *decided improvement* in beauty. The pictures were not taken in a binocular camera, and therefore do not stand out well, but by moving one or both until the eyes coincide in the stereoscope the pictures blend perfectly. If taken in a binocular camera for the purpose, each person being taken on one half of the negative, I am sure the results would be still more striking. Perhaps something might be made of this in regard to the expression of emotions in man and the lower animals, &c. I have not time or opportunities to make experiments, but it seems to me something might be made of this by photographing the faces of different animals, different races of mankind, &c. I think a stereoscopic view of one of the ape tribe and some low caste human face would make a very curious mixture; also in the matter of crossing of animals and the resulting offspring. It seems to me something also might result in photos of husband and wife and children, &c. In any case, the results are curious, if it leads to nothing else. Should this come to anything you will no doubt acknowledge myself as suggesting the experiment, and perhaps send me some of the results. If not likely to come to anything, a reply would much oblige me."

"Yours very truly,

"A. L. AUSTIN, C.E., F.R.A.S."

Dr. Carpenter informs me that the late Mr. Appold, the mechanician, used to combine two portraits of himself under the stereoscope. The one had been taken with an assumed stern expression, the other with a smile, and this combination produced a curious and effective blending of the two.

Convenient as the stereoscope is, owing to its accessibility, for determining whether any two portraits are suitable in size and attitude to form a good composite, it is nevertheless a makeshift and imperfect way of attaining the required result. It cannot of itself combine two images; it can only place them so that the office of attempting to combine them may be undertaken by the brain. Now the two separate impressions received by the brain through the stereoscope do not seem to me to be relatively constant in their vividness, but sometimes the image seen by the left eye prevails over that seen by the right, and

vice versâ. All the other instruments I am about to describe accomplish that which the stereoscope fails to do: they create true optical combinations. As regards other points in Mr. Austin's letter, I cannot think that the use of a binocular camera for taking the two portraits intended to be combined into one by the stereoscope would be of importance. All that is wanted is that the portraits should be nearly of the same size. In every other respect I cordially agree with Mr. Austin.

The best instrument I have as yet contrived and used for optical superimposition is a "double-image prism" of Iceland spar. The latest that I have had were procured for me by Mr. Tisley, optician, 172, Brompton Road. They have a clear aperture of a square, half an inch in the side, and when held at right angles to the line of sight will separate the ordinary and extraordinary images to the amount of two inches, when the object viewed is held at seventeen inches from the eye. This is quite sufficient for working with cartes-de-visite portraits. One image is quite achromatic, the other shows a little colour. The divergence may be varied and adjusted by inclining the prism to the line of sight. By its means the ordinary image of one component is thrown upon the extraordinary image of the other,

FIG. 1.

FIG. 2.

FIG. 3.

Fig. 1 shows the simple apparatus which carries the prism and on which the photograph is mounted. The former is set in a round box which can be rotated in the ring at the end of the arm and can be clamped when adjusted. The arm can be rotated and can also be pulled out or in if desired, and clamped. The floor of the instrument is overlaid with cork covered with

black cloth, on which the components can easily be fixed by drawing-pins. When using it, one portrait is pinned down and the other is moved near to it, overlapping its margin if necessary, until the eye looking through the prism sees the required combination; then the second portrait is pinned down also. It may now receive its register-marks from needles fixed in a hinged arm, and this is a more generally applicable method than the plan with cross threads, already described, as any desired feature—the nose, the ear, or the hand, may thus be selected for composite purposes. Let A, B, C, . . . Y, Z, be the components. A is pinned down, and B, C, . . Y, Z; are successfully combined with A, and registered. Then before removing Z, take away A and substitute any other of the already registered portraits, say B, by combining it with Z; lastly, remove Z and substitute A by combining it with B, and register it. Fig. 2 shows one of three similarly jointed arms, which clamp on to the vertical rod. Two of these carry a light frame covered with cork and cloth, and the other carries Fig. 3, which is a frame having lenses of different powers set into it, and on which, or on the third frame, a small mirror inclined at 45° may be laid. When a portrait requires foreshortening it can be pinned on one of these frames and be inclined to the line of sight; when it is smaller than its fellow it can be brought nearer to the eye and an appropriate lens interposed; when a right-sided profile has to be combined with a left-handed one, it must be pinned on one of the frames and viewed by reflection from the mirror in the other. The apparatus I have drawn is roughly made, and being chiefly of wood is rather clumsy, but it acts well.

and the composite may be viewed by the naked eye, or through a lens of long focus, or through an opera-glass (a telescope is not so good) fitted with a sufficiently long draw-tube to see an object at that short distance with distinctness. Portraits of somewhat different sizes may be combined by placing the larger one further from the eye, and a long face may be fitted to a short one by inclining and foreshortening the former. The slight fault of focus thereby occasioned produces little or no sensible ill-effect on the appearance of the composite.

The front and profile faces of two living persons sitting side by side or one behind the other, can be easily superimposed by a double-image prism. Two such prisms set one behind the other can be made to give four images of equal brightness, occupying the four corners of a rhombus whose acute angles are 45°. Three prisms will give eight images, but this is practically not a good combination; the images fail in distinctness, and are too near together for use. Again, each lens of a stereoscope of long focus can have one or a pair of these prisms attached to it, and four or eight images may be thus combined.

Another instrument I have made consists of a piece of glass inclined at a very acute angle to the line of sight, and of a mirror beyond it, also inclined, but in the opposite direction to the line of sight. Two rays of light will therefore reach the eye from each point of the glass; the one has been reflected from its surface, and the other has been first reflected from the mirror, and then transmitted through the glass. The glass used should be extremely thin, to avoid the blur due to double

reflections; it may be a selected piece from those made to cover microscopic specimens. The principle of the instrument may be yet further developed by interposing additional pieces of glass, successively less inclined to the line of sight, and each reflecting a different portrait.

I have tried many other plans; indeed the possible methods of optically superimposing two or more images are very numerous. Thus I have used a sextant (with its telescope attached); also strips of mirrors placed at different angles, their several reflections being simultaneously viewed through a telescope. I have also used a divided lens, like two stereoscopic lenses brought close together, in front of the object class of a telescope.

I have not yet had an opportunity of superimposing images by placing glass negatives in separate magic lanterns, all converging upon the same screen; but this or even a simple dioramic apparatus would be very suitable for exhibiting composite effects to an audience, and, if the electric light were used for illumination, the effect on the screen could be photographed at once. It would also be possible to construct a camera with a long focus, and many slightly divergent object glasses, each throwing an image of a separate glass negative upon the same sensitised plate.

The uses of composite portraits are many. They give us typical pictures of different races of men, if derived from a large number of individuals of those races taken at random. An assurance of the truth of any of our pictorial deductions is to be looked for in their substantial agreement when different batches of components have been dealt with, this being a perfect test of truth in all statistical conclusions. Again, we may select prevalent or strongly-marked types from among the men of the same race, just as I have done with two of the types of criminals by which this memoir is illustrated.

Another use of this process is to obtain by photography a really good likeness of a living person. The inferiority of photographs to the best works of artists, so far as resemblance is concerned, lies in their catching no more than a single expression. If many photographs of a person were taken at different times, perhaps even years apart, their composite would possess that in which a single photograph is deficient. I have already pointed out the experience of Mr. Appold to this effect. The analytical tendency of the mind is so strong that out of any tangle of superimposed outlines it persists in dwelling preferably on some one of them, singling it out and taking little heed of the rest. On one occasion it will select one outline, on another a different one. Looking at the patterns of the papered walls of our room, we see, whenever our fancy is active, all kinds of

forms and features. We often catch some strange combination which we are unable to recall on a subsequent occasion, while later still it may suddenly flash full upon us. A composite portrait would have much of this varied suggestiveness.

A further use of the process would be to produce from many independent portraits of an historical personage the most probable likeness of him. Contemporaneous statues, medals, and gems would be very suitable for the purpose; photographs being taken of the same size, and a composite made from them. It will be borne in mind that it is perfectly easy to apportion different "weights" to the different components. Thus, if one statue be judged to be so much more worthy of reliance than another that it ought to receive double consideration in the composite, all that is necessary is to double either the time of its exposure or its illumination.

The last use of the process that I shall mention is of great interest as regards inquiries into the hereditary transmission of features, as it enables us to compare the average features of the produce with those of the parentage. A composite of all the brothers and sisters in a large family would be an approximation to what the average of the produce would probably be if the family were indefinitely increased in number, but the approximation would be closer if we also took into consideration those of the cousins who inherited the family likeness. As regards the parentage, it is by no means sufficient to take a composite of the two parents; the four grandparents and the uncles and aunts on both sides should be also included. Some statistical inquiries I published on the distribution of ability in families* give provisional data for determining the weight to be assigned in the composite to the several degrees of relationship. I should, however, not follow those figures in the present case, but would rather suggest, for the earlier trials, first to give equal "weights" to the male and female sides; thus the father and a brother of the male parent would count equally with the father and a brother of the female parent. Secondly, I should "weight" each parent as four, and each grandparent and each uncle and aunt as one; again, I should weight each brother and sister as four, and each of those cousins as one who inherited any part of the likeness of the family in question. The other cousins I should disregard. The weights as previously mentioned would be bestowed by giving proportionate periods of exposure.†

* "Hereditary Genius," p. 317, column D. Macmillan. 1869.

† Example:—There are 5 brothers or sisters and 5 cousins, whose portraits are available: the total period of desired exposure is 100 seconds, $5 \times 4 + 5 = 25$; $\frac{100}{25} = 4$; which gives $4 \times 4 = 16$ seconds for each brother or sister, and 4 seconds each cousin ($5 \times 16 + 5 \times 4 = 100$).

Composites on this principle would no doubt aid the breeders of animals to judge of the results of any proposed union better than they are able to do at present, and in forecasting the results of marriages between men and women they would be of singular interest and instruction. Much might be learnt merely by the frequent use of the double-image prism as described above, which enables us to combine the features of living individuals when sitting side by side into a single image.

I have as yet had few opportunities of developing the uses of the composite photographic process, it being difficult, without much explanation, to obtain the requisite components. Indeed, the main motive of my publishing these early results is to afford that explanation, and to enable me to procure a considerable variety of materials to work upon. I especially want sets of family photographs all as nearly as possible of the same size and taken in the same attitudes. The size I would suggest for family composites is that which gives four-tenths* of an inch (or say 10 millimetres) interval between the pupil of the eye and the line that separates the two lips. The attitudes, about which there can be no mistake, are full face, an exact profile (say, always showing the *right* side of the face), and an exact three-quarters, always showing the left; in this the outer edge of the right eyelid will be only just in sight. In each case the sitter should look straight before him. Such portraits as these go well into cartes de visite, and I trust that not a few amateur photographers may be inclined to make sets of all the members of their family, young and old, and of both sexes, and to try composites of them on the principles I have described. The photographs used for that purpose need not be in the least injured, for the register marks may be made in the case into which they are slipped, and not in the photographs themselves.

Discussion.

Sir Edmund DuCane said: I had no intention of making observations on the lecture given Mr. Galton, but as I have been called on, I will explain my connection with the observations on making which, as Mr. Galton has explained, his experiments originated. In considering how best to deal with and repress crime, it occurred to me that we ought to try and track it out to its source and see if we cannot check it there instead of waiting till it has developed and then striking at it. To track crime to its source we must follow up the history of those who practise it, and specially in such lines as are likely (as has been alleged) to contain the true clue to their criminal

* I said *half-an-inch* in the original paper, but have since, for various reasons, adopted four-tenths of an inch instead, as my standard size.—August, 1878.

career. Among these subjects for observation that of the hereditary disposition is one of the most important, and to disentangle the effect of this from the effect of the bringing up. Mr. Galton very kindly undertook to try and ascertain if anything could be established on these points, and I therefore furnished him with the particulars of the personal characteristics and career of a great number of criminals and with their photographs. It seems to me to be a correct inference that if criminals are found to have certain special types of features, that certain personal peculiarities distinguish those who commit certain classes of crime; the tendency to crime is in those persons born or bred in them, and either they are incurable or the tendency can only be checked by taking them in hand at the earliest periods of life. Mr. Galton's process would help to establish this point, because if there is any such distinguishing feature it would come out in his mixed photographs in a clear line, whereas in those features which do not correspond the lines would be more or less blurred. I should anticipate that a great number of those who commit certain classes of crimes would be found to show an entirely inferior mental and bodily organisation; but on the other hand a very large number of criminals are rather superior in intelligence; so much so that I was quite recently informed by Colonel Pasley, the Director of Admiralty Works, that his observation was that convicts picked up a knowledge of a new trade with much greater rapidity than free workmen. In fact, it is often misplaced and unbalanced cleverness that leads to the attempt to commit crime, and this characteristic might very probably be found in the features of criminals of this class.

Mr. Cornelius Walford, after expressing his interest in the subject under discussion, drew attention to the fact that changes of location and of climate, possibly also of food, tended very materially to alter family and even national types of facial expression. As an instance, children of Irish parents born in the United States present usually quite a classical form of face, notwithsanding that the parents, in many cases, bore the strongest marks of nationality. Sir Charles Dilke, in his "Greater Britain," says that the same thing takes place in the Australian Colonies. It seems clear from this that even criminal types will not hold good under all circumstances. He did not quite know how this might affect Mr. Galton's theory. He also thought that experimenting upon a number of persons tended rather to generalise than to particularise the expression. These remarks were to be regarded as suggestions only.

Mr. Robert des Ruffières said: Mr. Galton's paper on "Composite Portraits" is both curious and suggestive, and may perhaps lead to important results in time to come. As it is, the author considers his discovery may be turned to good account in several ways, and notably as a means of comparing the average features of a family with those of its near ancestry. If I recollect rightly, Mr. Galton laid great stress on the eyes as one of the most important features, and especially in connection with his views, and no doubt with good reason; but it should not be forgotten that the

mouth also is a very characteristic feature, and it is not many years ago that a celebrated French painter undertook to show that it was possible to group the several personages of a historical picture, in such a way as to bring visibly before the mind of the spectator the passing scene, and that without the eyes of any of the *dramatis personæ* being visible. Mr. Galton's discovery has been spoken of elsewhere as a toy, but the same was said at the time of the Kaleidoscope, which has done such good service in the Arts, and very recently of the Radiometer, which it has been shown can be sucessfully applied in Climatology for testing gas-light, and other purposes.

Mr. HYDE CLARKE said it was necessary to accept Mr. Galton's results under the reservations and conditions he had imposed. Otherwise there was a danger of adopting wrong conclusions, as a mean or average did not represent a natural fact, but was an artificial term. Thus in the examples before them the criminal characteristics were eliminated, and they had a natural type of man instead. Thus, instead of a typical figure or a distinctive type, only an average was obtained. With regard to the question which had been raised as to change of character in America, he had termed the phenomena Creolism. Some men and animals underwent change and removal from one district to another, and it was recorded that in India some horses died by simple removal. It was remarkable that the phenomena known to us as "Yankeesim" were common to the United States and Australia. In the case of an emigrant bringing children of English type, then one child subsequently born might be of American type and another of English type. This appeared to affect English and Celts, but he had not traced it to Spaniards. It was to be observed that all Americans had not the Yankee type, but that many had a thorough English type. This showed that Creolism is not purely an influence of soil. Further, the Yankee type was produced in England, but rarely. There were various influences of removal, as, for instance, the effect on the skin and eyes of our African travellers.

The following paper was read by the Author.

The ORIGIN *of the* CLASSIFICATORY SYSTEM *of* RELATIONSHIPS *used among* PRIMITIVE PEOPLES.

By C. STANILAND WAKE, M.A.I.

THE author of the elaborate work on the systems of consanguinity and affinity in use among the several branches of the human race, published in 1871 by the Smithsonian Institute, has shown that the Turanian, the Ganowanian (American Indian), and the Polynesian families of mankind, instead of using a descriptive system of relationships, such as that found among the more cultured peoples, class together *consanguinei*

by what might seem to be mere arbitrary generalisations applying a common term to all the members of a particular class.

According to this *classificatory* system, in its most primitive form as known to us, and as still used among the Hawaiians of the Sandwich Islands, a man's relations are thus described:—

Grandfather Grandmother's brother Grandfather's „	Grandparent male, grandfather, *in next stage.*
Grandmother Grandfather's sister Grandmother's „	Grandparent female, grandmother, *in next stage.*
Father Mother's brother Father's „	Parent male, father, *in next stage.*
Mother Father's sister Mother's „	Parent female, mother, *in next stage.*
Mother's brother's child Father's „ „ Father's sister child Mother's „ „	Brother or sister (elder or younger).
Mother's brother's son's child Father's „ „ „ Father's sister's „ „ „ Mother's „ „ „ Brother's child Sister's „	Child (male or female).
Mother's brother's son's grandchild Father's „ „ „ Father's sister's „ „ Mother's „ „ „ Brother's grandchild Sister's „	Grandchild (male or female).

The special peculiarity of this system will be seen at a glance if these various persons are arranged in grades thus:—

Grand-parent (male or female)	Grandfather's sister	Grandfather's brother	Grandfather		Grandmother	Grandmother's brother	Grandmother's sister
Parent (male or female)	Father's sister	Father's brother	Father		Mother	Mother's brother	Mother's sister
Brother or *Sister*	Father's sister's child	Father's brother's child	Brother	Ego	Sister	Mother's brother's child	Mother's sister's child
Child	Father's sister's child's child	Father's brother's child's child	Brother's child	Child	Sister's child	Mother's brother's child's child	Mother's sister's child's child
Grandchild ..	Father's sister's child's grandchild	Father's brother's child's grandchild	Brother's grandchild	Grandchild	Sister's grandchild	Mother's brother's child's grandchild	Mother's sister's child's grandchild.

Thrown into this position, we see that in the primitive system under examination persons related by blood are placed in certain general classes, not according to their degree of relationship to a particular individual, but according to the generation to which they belong. This exactly answers to the Chinese "grades of relatives," as pointed out by Mr. Morgan, who says: "If we make the application, commencing with grandfather, it will be seen that my grandparents, and such kinsmen of theirs as stand to me in the relation of grandparents, form one grade or class; that my parents and such relatives of theirs as stand to me in the relationship of parents form a second grade or class; that myself, with my brothers and sisters, and my collateral brothers and sisters, form a third grade or class; that my children, and the children of my collateral brothers and sisters, form a fourth grade or class; and that my grandchildren and my collateral grandchildren form a fifth grade or class. Those of each grade stand to *Ego* in the same identical relationship, and the individuals of the same grade or class stand to each other in the relationships of brothers and sisters."*

Mr. Morgan's explanation of this system of relationship has been recently reproduced by him in a work treating of the social conditions of "Ancient Society." In the latter publication it is stated that the Malayan form of the classificatory system, as preserved among the Polynesian Islanders, "defines the relationships that would exist in a consanguine family; and it demands the existence of such a family to account for its own existence. Moreover, it proves with moral certainty the existence of a consanguine family where the system was formed."† Mr. Morgan affirms, moreover, that the Malayan system originated in "plural marriages of *consanguinei*, including own brothers and sisters; in fact, commenced with the intermarriage of the latter, and gradually enfolded the collateral brothers and sisters as the range of the conjugal system widened."‡ Elsewhere he observes that the consanguine family and the Malayan system of consanguinity presuppose antecedent promiscuity.§ I shall not at present refer particularly to this latter point, as Mr. Morgan himself admits that the existence of the prior state of promiscuity is merely an inference,‖ and if it can be shown that the consanguine family has not existed as a recognised social institution, the earlier sexual condition may be assumed to be equally mythical.

* "Systems of Consanguinity, &c.," p. 455.
† "Ancient Society," p. 402.
‡ *Ibid.* p. 408.
§ *Ibid.* p. 501.
‖ *Ibid.* p. 418.

What, then, we have to consider is the consanguine family, arising from the intermarriage of brothers and sisters, evidence of the former existence of which Mr. Morgan finds in that of the Malayan system of relationships itself. He supports this evidence, moreover, by the statement that in the time of the first American missionaries, brothers and sisters intermarried among the Sandwich Islanders without reproach. If this statement were strictly true, it would be of essential service to Mr. Morgan's argument, but its value is materially lessened by the remark made by one of the missionaries to the effect that the union of brother and sister in the highest ranks became fashionable.* This may have been so at a comparatively recent date, but the practise probably originated in the custom mentioned by Mr. Jarves, according to which the highest chief was obliged to marry the next woman in rank to himself, whatever their relationship.† The object of this custom is explained by Admiral Wilkes, who states that such marriages were entered into by the king for the purpose of preventing competition to the throne. This writer adds, nevertheless, that it is, "in other cases, contrary to the customs, habits, and feelings of the people,"‡ although in the decayed condition of Hawaiian society§ it is not improbable that the lower chiefs imitated the conduct of their sovereign. Mr. Morgan, however, refers to another custom which appears to him to furnish actual evidence of the former existence of the consanguine family among the Sandwich Islanders. The American missionaries found in operation among them a peculiar marriage custom according to which two or more brothers with their wives, or two or more sisters with their husbands, lived in common. Such an association constituted the *Punalúan* family, which, says Mr. Morgan, was evidently formed out of the consanguine family. Brothers had, however, ceased to marry their own sisters; "and, after the gentile organisation had worked upon society its complete results, their collateral sisters as well. But in the interval they shared their remaining wives in common. In like manner, sisters ceased marrying their own brothers, and after a long period of time their collateral brothers; but they shared their remaining husbands in common."‖ This is Mr. Morgan's interpretation of the phenomena in question, but the *Punalúan* group can be accounted for satisfactorily without assuming the prior existence of the consanguine family. It is true Mr. Morgan

* "Ancient Society" p. 415.
† "History of the Hawaiian Islands," p. 80.
‡ "United States Exploring Expedition," Vol. iv, p. 32.
§ Wilkes, *op. cit.*, Vol. iv., pp. 32-45.
‖ "Ancient Society," p. 428.

affirms that own brothers and sisters were not entirely excluded from the former, but he does not furnish evidence in support of the statement. Even if true, the fact might be explained as exceptional, and as due to the deprivation of manners referred to by Admiral Wilkes. The relationship of *Pŭnalŭa* depends merely on several brothers and their wives, or several sisters and their husbands living in common, and there is no reason why this fact should presuppose the intermarriage at an earlier period of brothers and sisters, and communism in their sexual relations. It is evident, on consideration, that the two customs are totally distinct, and that while the former is perfectly consistent with the general rule as to marriage, founded on the incapacity of such a relation being established between persons bearing the same family or clan name, the latter is utterly opposed to it. There is nothing in the early rules of marriage opposed to the primitive custom of a man marrying several women, whether sisters or not, of a different clan from his own. Such a custom is indeed common with the North American tribes, in many of which a man can claim all the sisters of his wife as they reach a marriageable age, which Mr. Morgan supposes to be a relic of the *Pŭnalŭan* family.* We are not concerned at present with the origin of this family, but only with its incidents, and seeing that the peoples among whom it was found fully recognised the important principle of kinship through females,† which is the basis of the gentile organisation, it is extremely improbable that they allowed, except under special circumstances, marriages between brothers and sisters of the whole blood—that is, children bearing the same family name. It is very different, however, where a man and woman, although having the same father, are born of different mothers. In this case the ideas which are at the foundation of the classificatory system would not operate to render unlawful a union between the persons thus related. In accordance with this fact, we find that marriage between half-brothers and half-sisters has been customary among peoples of all degrees of civilization. This practice is, according to the first principles of the classificatory system, perfectly innocent, and like the *Pŭnalŭan* custom of intermixed polygamous and polyandrous marriage, furnishes absolutely no evidence of the prior existence of marriage between brothers and sisters of the whole blood.

* "Ancient Society," p. 432.

† *Ibid.* pp. 433, 515. Among both the Hawaiians and the Tongans rank descended chiefly through females—*See* Jarves, *op. cit.* p. 84. Also Mariner's "Tonga and the Tongans," Vol. ii., pp. 84, 96.

If this conclusion be correct, it is evident that the Malayan system of consanguinity and affinity, instead of furnishing, as Mr. Morgan supposes, conclusive proof of the prior existence of the consanguine family, must have an entirely different meaning. What this is I shall now proceed to show. Mr. Bingham is quoted by Mr. Morgan as stating, with reference to the Hawaiians, that the terms of relationship are "so loosely used that in common conversation I am often much puzzled to know who is referred to, until I have put specific questions."* A similar remark has been made in relation to the Malagasy, among whom, says a late writer, "it is often difficult to ascertain exactly the relationship of members of a family, for first cousins are usually termed brother and sister, and uncles and aunts—father and mother respectively; and it is only by asking distinctly of persons whether they are 'of one father,' or are uterine 'brother or sister,' that we learn the exact degree of relationship. These secondary fathers and mothers seem often to be regarded with little less affection than the actual parents."† Mr. Morgan would see in this a reference to his consanguine family, but there is another fact which is quite inconsistent with such a view. In the more advanced *Pŭnalŭan* family (he says), brothers had ceased to marry their own sisters, although they shared their remaining wives in common ;‡ but in the Malagasy system the marriage restrictions are much more stringent. By these, marriage is forbidden between a brother and sister of the same father and mother, or between any of their children or grandchildren. It is also forbidden between the children and descendants of two sisters by the same mother to the sixth generation, or rather to the seventh generation including the common ancestor.

These regulations are based on consanguinity, and appear to be framed for the purpose of preventing marriages between near blood relations. They reveal, moreover, a system of relationship perfectly analogous to the grades of relations of the Sandwich Islanders; somewhat more extended, certainly, as it embraces seven generations instead of five. This may not have been so originally, however, as the two last generations take special titles, owing possibly to their having been included subsequently to the formation of the system.§ As a system based on marriage restrictions, nevertheless, that of the Malagasy is imperfect in the male line, seeing that the descendants of the grandchildren

* "Systems of Consanguinity, &c.," p. 461.

† Sibree's "Madagascar and its People," p. 192.

‡ "Ancient Society," p. 428.

§ Mr. Sibree, indeed, says that the descendants of two sisters by the same mother down to four generations do not intermarry—"Madagascar and its People," p. 192.

of a brother and sister by the same parents may freely intermarry. Mr. Ellis states, moreover, that, "collateral branches on the male side are permitted in most cases to intermarry, on the observance of a slight but prescribed ceremony, which is supposed to remove the impediment or disqualification arising out of consanguinity."* It would seem, therefore, that the Malagasy at one time viewed consanguinity, arising from the descent from a common *female* ancestor, as a bar to intermarriage, while, as among the collateral relations on the male side, the consanguinity being considered weak, it was not treated as an absolute disqualification. This result is due to the influence over the Malagasy mind of the primitive custom of tracing kinship through the mother, which is still seen in the fact that the genealogy of the sovereign and the nobles are traced by the female and not by the male line. This, Mr. Ellis thinks, proceeds on "the supposition of its being impossible in any given case to ascertain with certainty the male parent of a child, or that parentage is more easily and more obviously identified on the mother's than on the father's side." This may not be the actual reason, but Mr. Ellis remarks of the Malagasy, "their sensuality is universal and gross, though generally concealed; continence is not supposed to exist in either sex before marriage, consequently it is not expected, and its absence is not regarded as a vice."† We have here an example of a people exhibiting, like the Polynesian Islanders, the utmost laxity in sexual conduct, and yet possessing stringent regulations for the prevention of intermarriage of blood relations. Moreover, while still adhering for some purposes to the primitive idea of kinship being dependent on descent from a common female ancestor (although marriages between brother and sister by different mothers are not allowed), children inherited from their fathers, and relationship through the father, was actually recognised. This confirms what is evident from the passage already cited from Mr. Sibree's work, that the Malagasy have the same classification of relations in grades as that which is exhibited by the Malayan system of the Hawaiians. We are justified, therefore, in assuming that, as the former is accompanied by restrictions intended to prevent the intermarriage of individuals included within those grades, the same is true also of the latter system. This assumption is totally different from, and, in fact, is quite opposed to, that required by Mr. Morgan's theory. This has for its aim, however, the explanation of the classificatory system of consanguinity and affinity, and not the proof of the existence of the consanguineous family. If, therefore, the former can be ac-

* "History of Madagascar," Vol. i., p. 164.
† *Ibid.*, Vol. i., p. 137.

counted for without reference to such a family, there is no reason why it should not be associated with, if not based on, marriage restrictions.

Before proceeding to show the real origin of the classificatory system, it is necessary to consider Mr. Morgan's statement that the Hawaiians did not rise to the conception of a *gens*, which is later than the first appearance of the *Pŭnalŭan* family,* on which their system of relationship is supposed to be dependent. According to the American writer, the *gens* "embraced all such persons as traced their descent from a supposed common female ancestor, through females, the evidence of the fact being the possession of a common gentile name." It did not include *all* the descendants of the common ancestor, because "the children of her sons, and the children of her male descendants, though males, would belong to other gentes, namely, those of their respective mothers."† The *gens* of Mr. Morgan is, however, something more than a large association of persons having a common female ancestor. It is a social organisation having certain "rights, privileges, and obligations conferred and imposed upon its members, and which made up the *jus gentilicium*."‡ When, therefore, Mr. Morgan speaks of the *gens*, it is clear that he refers, not to a mere family group, but to a developed institution, which he describes as "a gentile society (*societas*) as distinguished from a political society or state (*civitas*)." The origin and base of this society is, however, the simple "body of consanguinei bearing a common gentile name;"§ and we cannot doubt that wherever this exists, the gentile institution will be developed, if it is required by the conditions of social existence. Its non-development is, in fact, evidence of the non-existence of those conditions, and we must suppose, therefore, that the Polynesian peoples have not risen to the conception of the *gens*, because the tribal organisation which they exhibit is more fitted to their circumstances. Among all of them this organisation had become established when they were first visited by Europeans. In the Sandwich and Society Islands the government was an arbitrary monarchy, the supreme authority being vested in the king and hereditary in his family.‖ The respect shown for the sovereign was remarkable. The king and queen were looked upon as almost divine, and everything belonging to them became sacred: even the men who carried them and the

* "Ancient Society," p. 434.
† *Ibid.* p. 67.
‡ *Ibid.* p. 71.
§ *Ibid.* p. 66.
‖ Ellis' "Polynesian Researches," Vol. iii., pp. 93, 99; and *see* Jarves' "History of the Hawaiian Islands," p. 32.

ground they touched.* Moreover, the power of the chiefs of the districts into which the Islands were divided was even greater than that of the king over the whole. The lives, as well as the property of the people, were at their disposal.† The *tapu* was the great weapon of sovereign authority, and the sacred character of the chief on which it was based would almost lead us to believe that the Polynesian peoples had passed through a political stage far in advance of that which they now exhibit. Not only was the tribal organisation firmly established among them, but, judging by the property test provided by Mr. Morgar himself, their general culture was superior to that of the gentile Americans. The latter have only among the most advanced tribes substituted, in relation to cultivated land, an exclusive inheritance in children in the place of the earlier gentile inheritance,‡ whilst the Polynesian peoples appear to have long since reached the higher stage. The Rev. Wm. Ellis states in his "Polynesian Researches," that "the *bue raatira*, gentry and farmers, has ever been the most numerous and influential class, constituting at all times the great body of the people and the strength of the nation. They were generally the proprietors and cultivators of the soil, and held their land, not from the gift of the king, but from their ancestors."§ It would seem as though the Polynesian Islanders had possessed much the same political and social organisation as the Japanese exhibited before this race became subjected to the influences of Chinese culture, feudal institutions being established by warlike conquerors among a people whose ideas in relation to sexual conduct were of a very primitive character. Admiral Wilkes expressly declares that from the earliest period of Hawaiian history the tenure of lands has been, in most respects, feudal, and that "the origin of the fiefs was the same as in the northern nations of Europe." The actual cultivator of the land could at any moment be dispossessed by his chief, but self-interest, and a certain sense of propriety, says Wilkes, prevented such a step, so that those possessing farms were seldom disturbed.‖

The perfect development of the tribal organisation among the Polynesian Islanders, and the absence of the clan institution, would lead us to expect the recognition by them of kinship through males, either in combination with, or in substitution for,

* Jarves' "History of the Hawaiian Islands," p. 101 *seq.*

† *Ibid.* p. 120.

‡ "Ancient Society," p. 531.

§ Vol. iii., pp. 96, 115. The New Zealanders appear, however, to be in the same stage as the less advanced American tribes. (*See* Taylor, *op. cit.* p. 355.) In the Society Islands, on the other hand, the power of devising land by will was established before the arrival of the missionaries. (Ellis, *op. cit.*, Vol. iii., p. 115.)

‖ "United States Exploring Expedition," Vol. iv., p. 34.

that through females. Mr. Morgan, indeed, affirms the Malayan system of consanguinity shows "plainly and conclusively that kinship through males was recognised as constantly as kinship through females. A man had brothers and sisters, grandfathers and grandmothers, grandsons and granddaughters, traced through males as well as through females." He adds, however, "the maternity of children was ascertainable with certainty, while their paternity was not; but they did not reject kinship through males because of uncertainty, but gave the benefit of the doubt to a number of persons; probable fathers being placed in the category of real fathers, probable brothers in that of real brothers, and probable sons in that of real sons."* If the explanation given by Mr. Morgan of the Hawaiian system of relationship were correct, the reason here assigned for the recognition of the kinship through males would probably be sufficient. It is not, however, consistent with the social phenomena presented by the peoples among whom that system is prevalent. Thus it is remarkable that in the Society Islands, notwithstanding the absolute power of the king, his authority lasted only so long as he had no son to occupy the throne. On the birth of a son the sovereign invariably abdicated, the royal name was conferred on the infant, and his father was the first to do him homage by saluting his feet and declaring him king. This practice was not confined to the royal family, but was customary also among the nobility and the *raatiras*, in both which classes, says Ellis, "the eldest son, immediately at his birth, received the honours and titles which his father had hitherto borne."† This writer supposes that the practice was adopted to secure a son the undisputed succession to his father's dignity and power. Probably the real object was to hinder the operation of the primitive regulation according to which a man's heirs were his sister's children. The tribal organisation would have a tendency to heighten the respect for the male parent at the expense of the female, and thus, although among the Hawaiians rank descended chiefly through females, on the whole, women occupied a very inferior social position. Ellis says that the father was magistrate in his own family, and he alone ever exercised any control over his children; "the mother was always disregarded, and the father has often encouraged them to insult and violence, while all interference of the mother has been resisted by the child."‡ Among the New Zealanders, when a man died his eldest son

* Morgan's "Ancient Society," p. 515.

† *Op. cit.* iii., 99, *seq.* Have we not a reference to this custom in the Malagasy practice of a father taking the name of his eldest son?—Sibree's "Madagascar and its Peoples," p. 198.

‡ *Op. cit.* i., 261; iii., 121. Among the Tongans also the father has absolute authority in his own household.—*Op. cit.* Vol. iii. p. 169.

took the family name which his father had held before him, the second son assuming the father's second name.* Among the Tongans, the Matabooles and the Mooas are succeeded by their sons in their dignities,† and not by their nephews as where descent is traced solely by the female line.‡ So, also, the children belong to the tribe of their father, both among the Tongans and Fijians, as appears by Mr. Fison's replies to the inquiries made by Mr. Morgan.§ The rights acquired by a New Zealander in land which he has brought under cultivation, descend to his children, and the first-born son of a Maori has all the rights of primogeniture.‖

These facts, which are inconsistent with uncertainty as to the paternity of the child, show also that kinship through the male is for certain purposes preferred by the Polynesian peoples to kinship through the female. Where such is the case, particularly when marriage is permitted within the tribe, as among the Polynesian Islanders,¶ certain regulations will be necessary if it is desired to prevent the intermarriage of near blood relations. Especially would this be the case where such an institution exists as that of *Pŭnalŭa*, which allows several brothers or sisters to have their wives or husbands in common. Among the American aborigines, whose system of relationships is supposed by Mr. Morgan to be founded on the *Pŭnalŭan* custom, there is an abhorrence of such intermarriages. Mr. Morgan states that "the structure and principles of the organisation (into gentes) tended to create a prejudice against the marriage of consanguinei, as the advantages of marriages between unrelated persons were gradually discovered through the practice of marrying out of the *gens*." He adds: "This seems to have grown apace until a public sentiment was finally arrayed against it, which had become very general among the American aborigines when discovered."** Such a sentiment is strongly developed among the West Africans, whose system of relationship probably agrees closely with the Malayan,†† and who, as appears from a statement made by Du Chaillu, quoted by Mr. Morgan,‡‡ consider the the least consanguinity an abomination where marriage is concerned. Even the aborigines of Australia have a similar abhor-

* Taylor.—*Op. cit.* p. 326.
† Mariner.—*Op. cit.* Vol. ii., p. 86.
‡ If a wife is superior to her husband in rank, he has however to show her proper respect.—Mariner, Vol. ii., p. 92.
§ "Systems of Consanguity, &c.," p. 579.
‖ *Op. cit.* p. 338–355.
¶ Such is the case with the New Zealanders. (*See* Taylor, *op. cit.* p. 413.)
** "Ancient Society," p. 458.
†† *Ibid.* p. 463.
‡‡ *Ibid.* p. 371.

rence of consanguinous marriages, and the formation of this sentiment is probably due to some other cause than that assigned for it by Mr. Morgan. The prohibition of intermarriage in the *gens* no doubt limited the range of the *Pŭnalŭan* group, as it prevented the formation of the marriage relation between any of the descendants in the female line of each ancestor within the *gens*.* If, however, the gentile organisation has such an operation, it might be supposed that where, as in the Malayan system, kinship through both males and females is recognised, the restriction on intermarriage between blood relations would be still greater, and it would be so even if descent is limited to the male line only. In the one case, if a man had several wives, each belonging to a different *gens*, his children by one wife would primitively be allowed to intermarry with those of another wife; as they would belong to different gentes. But in the other case, as all the children take the name of their father, none of them would be permitted to intermarry. We have an example of this with the Chinese, among whom "custom and law alike prohibit intermarriage on the part of people bearing the same family surname."† Now this is a most important case, because not only do the Chinese, like the Polynesian peoples, recognise kinship through both father and mother,‡ while preferring that through the male for the purpose of tracing descent, but they have a classification of relations answering almost exactly to the five grades of relations of the Malayan system. Mr. Hart supposes the Chinese system of relationship to have had its origin in the cradle lands of humanity, when "each successive birth was considered as increasing the *one* family, and as being in relationship with every individual composing that family."§ Such an original is to be found in the Malayan system, which, therefore, we shall be justified in explaining by the light of that of the Chinese. The fundamental idea on which the latter system is based is, that all the descendants of a male ancestor are consanguinei, and therefore that they ought not to be allowed to intermarry. The common ancestor becomes the starting point in tracing descent, and all his descendants are ranged together in categories according to the position they occupy in the line of descent, and hence all the persons in each generation, whatever their actual relationship to each other, are classed together under a common term. For all practical purposes the Chinese

* "Ancient Society," p. 458.

† Morgan's "Systems of Consanguinity, &c.," p. 424, *note*.

‡ For a reference to female relationship among the Chinese, *see* "Systems of Consanguinity, &c.," p. 425, *note*.

§ *Ibid.* p. 425. *note*.

system recognises only nine grades of relations, being that of *Ego* with four generations above and below him, and therefore the restriction as to marriage may have originally applied only within those limits.* The nine generations of the Chinese are equivalent to the five grades of the Malayan system, which include that of *Ego* with two below and two above him, instead of four, as in the Chinese system. In the latter, however, a grandfather is called "ancestral father," and a grandmother "ancestral mother," a great grandfather being an "additional ancestor," and a great grandmother, a "more remote ancestral mother," which answers almost exactly to the Hawaiian custom.

The analogy between the Chinese and Malayan systems of consanguinity is so exact, we cannot doubt that the latter as well as the former has the regulation of marriage for its aim. In fact, as already mentioned, the Malagasy form of the Malayan system *is* associated with restrictions on marriage, such as we should expect to find among the Polynesian peoples. The reference to a common ancestor which gives the classification of relations in grades, and which has no meaning in Mr. Morgan's theory, except so far as it is supposed to reveal "a condition of promiscuous intercourse, involving the cohabitation of brothers and sisters, and perhaps of parent and child,"† would more probably therefore be intended to identify the individuals between whom marriage is *not* allowable, or at least to exclude from marriage possibility the blood relations included within the grades. It is strange that, while so carefully classifiying all the relationships acknowledged by various primitive peoples, Mr. Morgan has ascertained little as to the marriage restrictions with which the systems of consanguinity are connected. That these are of fundamental importance is shown by the fact that among the Australians, the people whom Mr. Morgan places the lowest in the scale of humanity as exhibiting an organisation of society on the basis of sex, the system of consanguinity is connected with an elaborate series of marriage regulations, which we cannot doubt are really intended to prevent marriages between near blood relations. This has so important a bearing on the whole subject of the origin of the peculiar system treated of by Mr. Morgan that I shall proceed to consider the Australian phase of it more at length.

Mr. Morgan states that the "organisation upon sex has not been found, as yet, in any tribes of savages out of Australia," and he affirms that "the Australians rank below the Polynesians, and far below the American aborigines. They stand below the African negro and near the bottom of the scale. Their social

* "Systems of Consanguinity, &c.," p. 423, *note*.
† *Ibid.* p. 481.

institutions, therefore, must approach the primitive type as nearly as those of any existing people."* This seems hardly consistent with the statement that the *gens* or clan was unknown among the Polynesian peoples, although fully recognised by the Australians. It is still less so with the fact that, while the former race have only got so far as to distinguish *brother* and *sister* from the other members of the child grade, the latter not only recognise the relationship of *nephew* and *niece*, but also that of *cousin*, which belongs to a somewhat advanced phase of the classificatory system. Mr. Morgan bases his argument as to the primitive nature of the Australian system upon the assumption that the oldest division of the people was into classes, which consist of four great primary groups of brothers and sisters, each group being composed of a male and female branch. The classes, he adds, embody the germ of the *gens*, but they are accompanied with a regulation in accordance with which marriage is "restricted to a portion of the males of one *gens*, with a portion of the females of another *gens*, which is opposed to the true theory of the gentile institution, for all the members of each *gens* should be allowed to marry persons of the opposite sex in all the gentes except their own."†

It must be noticed, however, that originally among the Kamilaroi, whom Mr. Morgan takes as representative of the Australian tribes, there were only two gentes,‡ and therefore primitively every member of one *gens* could marry with every member of the other *gens*, assuming that the division into classes did not then exist. This assumption, no doubt, is not consistent with the theory under consideration, which requires that the division into classes should have preceded the *gens*. Mr. Morgan, however, supposes that each gens is made up theoretically of the descendants of two supposed female ancestors, and it is quite possible that the limitation as to marriage he refers to may have arisen from the addition of the class division to the gentile organisation, rather than the reverse, as I shall proceed to show.

The chief class among the Kamilaroi is said by Mr. Ridley to be the Murri, and we will assume, therefore, that the two original clans or gentes were those into which Murri is now divided—*Duli* (Iguana) and *Murriira* (Paddymelon).§ The members of these two gentes, although belonging to the same class, are allowed to intermarry so long as the male and female belong to a different *gens*, and all the children of these marriages follow the *gens* of their mother. If, now, the Australian

* "Ancient Society," p. 51.
† *Ibid*, p. 52.
‡ *Ibid*. p. 57.
§ A species of Kangaroo.

relationships are placed together as shown in diagram A,* we shall see that, while the division into grades of relations which subsists among the Hawaiians is really at the foundation of the Australian system, the latter, so far from being of the barbarous nature supposed by Mr. Morgan, is far advanced, and in the division into classes gives evidence of elaborate organisation. An examination of the diagram in which *Murri* (Ego) marries *Butha*, shows, on comparing the names which denote to what class the several individuals belong, that, with a single exception, all those bearing a common class title in the same grade stand in the same degree of relationship to *Ego*. Thus Murri and Matha are brothers and sisters, Kumbo and Butha cousins, Ippai and Ippatha sons and daughters, Kubbi and Kubbotha nephews and nieces. The exception is in the parental grade, but it is explicable according to the principle that women belonging to different classes must stand in a different relationship to *Ego* among themselves, this being true also of men in the same grade. The consequence of this rule is, that the mother's brother being of a different class to her husband, the former must be "uncle" to *Ego*, while the father's sister belonging to a different class from that of his wife must be "aunt" to *Ego*. The diagram above referred to shows the *female* stem, but the same phenomena are exhibited by a diagram (B),† showing the *male* stem according to the Australian system, except that the class names are reversed in position, and instead of the mother's brother being uncle, the father's sister is aunt. Exactly the same result follows whichever member of the several subdivisions is taken as *Ego*, except that the relationships are expressed by different terms. Difference of class name denotes difference of relationship when in the same grade; in the parental grade the comparison being between mother and father's sister, and father and mother's brother.

The operation of the rules of the Australian system of classification may be explained in the following tabular form :—

Ego.	Children.	Nephew and Niece.	Brother and Sister.	Cousin.
Murri..	Ippai and Ippatha.	Kubbi and Kubbotha	Murri and Matha	Kumbo and Butha
Kumbo	Kubbi and Kubbotha.	Ippai and Ippatha	Kumbo and Butha	Murri and Matha
Ippai..	Murri and Matha	Kumbo and Butha	Ippai and Ippatha	Kubbi and Kubbotha
Kubbi	Kumbo and Butha.	Murri and Matha	Kubbi and Kubbotha	Ippai and Ippatha

* Diagram A at end.
† Diagram B at end.

This result is arrived at on the assumption, which is correct in most cases, that—every Murri marries Butha; every Ippai marries Kubbotha; every Kumbo marries Matha; every Kubbi marries Ippatha. On the same assumption, and taking *Ego* as a female, the result is the same, except that children exchange titles with nephews and nieces.

If a man marries within his own class the relationship will not be denoted by the class name alone. This is shown, however, by the *clan* name, which will be different in the case of "sons" and "daughters," and in that of "nephews" and "nieces," since, although marrying within his own class, he must marry out of his clan. The effect of this is shown in a third diagram (C),* where the class to which *Ego* belongs is *Murri murriiri* and that of his wife *Matha duli*. Here we see that all the members of the grade of *Ego* belong to the Murri class, whilst all the members of the child grade are included in the Kubbi class, although belonging to different gentes. In relation to Murri, the *Murri* class is evidently merely a name denoting all the members of his own grade, and the *Kubbi* class those of the grade below him, and the terms may, therefore, be considered as equivalent to those used in the Malayan system as classifications of the members of the same grades or generations. This notion is confirmed by the fact that all the classes are included in the fraternal and filial grades of the Australian system, the two later class terms having been added to express the new relationships of cousin and nephew or niece. Mr. Morgan himself supposes that originally "there were but two male and two female classes which were set opposite to each other in respect of the right of marriage."† By two male and two female classes is really meant two classes each divided into a male and a female branch, and they would answer to the two primitive grades of relations which is at the foundation of the classificatory system, each of which would comprise two gentes, being those of the maternal ancestors. Mr. Morgan, however, affirms that the *gens* was unknown when the organisation into classes was introduced, and that this organisation was "directed to the single object of breaking up the intermarriage of brothers and sisters."‡ Judging from the rules of descent, which show an intimate connection between the classes and the relationships recognised in the fraternal and filial grades, it is much more probable that those rules were framed for the purpose of accurately defining the blood relationship between members of the tribe, all of whom, on the assumption of their having been

* Diagram C at end.
† "Ancient Society," p. 56.
‡ *Ibid.* p. 58.

originally only two families, are necessarily descended from the same common ancestors. It is confirmatory of the view here taken that the application of the class terms of the Australian system is governed by the *clan* relationships already established. Thus according to diagram C, which shows the division into two classes only, the children of brothers belong to the same clan because their wives belong to the same clan, while the children of sisters belong to another clan, being that of their own mothers. Exactly the same thing occurs in connection with the classes, as is seen by reference to the diagram A, showing the descent where Murri marries Butha instead of Matha. In this case the children of brothers are Ippai and Ippatha, but those of sisters are Kubbi and Kubbotha, terms which are here equivalent to nephew and niece. Moreover, all the other members of the child grade who, according to the last-named diagram, are Kubbi and Kubbotha, belong in the other case to the same clan as the children of a sister. On the other hand, those who on the marriage of Murri with Butha are Ippai and Ippatha, are, when Murri marries Matha, referred to the same clan as the children of *Ego* and his brothers. In the fraternal grade the same thing occurs; those who are Kumbo and Butha (cousins) in the one case, belonging in the other to a different clan from *Ego* and those who are classed as his brothers and sisters.

It was said above that the restriction according to which a portion only of the males of one *gens* could intermarry with only a portion of the females of another *gens*, and which Mr. Morgan refers to as evidence that the *gens* is only in process of development out of the class organisation, probably arose rather from the addition of this organisation to that of the *gens*. Mr. Morgan* has made a very useful arrangement of the gentes in relation to the classes, from which it appears that the former are in pairs through the classes, as follows:—

Gentes.	Male.	Female.	Male.	Female.
1 Iguana (duli)	all are Murri	and Matha	or Kubbi	and Kubbotha
2 Emu (dinoun)	„ Kumbo	„ Butha	„ Ippai	„ Ippatha
3 †Kangaroo (murriira)	„ Murri	„ Matha	„ Kubbi	„ Kubbotha
4 Bandicoot (bilba)	„ Kumbo	„ Butha	„ Ippai	„ Ippatha
5 Opossum (mute)	„ Murri	„ Matha	„ Kubbi	„ Kubbotha
6 Blacksnake (nurai)	„ Kumbo	„ Butha	„ Ippai	„ Ippatha

Now according to the marriage relations in force, Murri can marry any Butha, and as Ippatha is found in the same gentes as Butha, it might be supposed that Murri ought to be able to

* "Ancient Society," p. 56.

† Paddymelon.

marry Ippatha also. He cannot do so, however, and Mr. Morgan looks upon this restriction as a mark of imperfect development of the gentile organisation. But its real object is seen at once when we know that Ippatha are all classed as the children of Murri, and belong to the same clan as his wife Butha, showing that Ippai is the child grade to Butha as the maternal grade. In the same way Kubbi is the child grade to Matha as the maternal grade, and a similar restriction as to marriage is, therefore, found in relation to Kumbo, who can marry any Matha but not Kubbotha. Exactly the same thing occurs in relation to the Kubbi and Ippai class. The fact that the class division excludes from the right of marriage the persons described as children, while recognising the rules of the gentile organisation, appears to me to be a conclusive proof that the former was primitively connected with such a restriction. This opinion is confirmed by the fact that, through the operation of the Australian marriage regulations, a man cannot marry any member of the grade below him, and is restricted to his cousin or his collateral sister. Mr. Morgan supposes that Murri was originally restricted to Butha, and that he was afterwards permitted to marry his collateral sister Matha. This, however, is contrary to his own theory that marriage between brothers and sisters was the most primitive. Butha is the *cousin* of Murri, and, according to that theory, marriage between them must have been of a subsequent date to that of Murri and Matha. The word *Butha* is in reality equivalent to "cousin," and the use of this term of relationship, which supposes the existence of the four class divisions, shows that marriage between Murri and Butha is of a later origin than that between Murri and Matha, which requires the existence of only two gentes.

That the class names of the Australian system had the origin already mentioned may be shown more clearly by reference to the rules of descent. Before stating these, however, it is advisable to set out the regulations of marriage as given by Mr. Ridley.

These regulations are as follows:—

1. Muri duli marries Matha murriira or any Butha.
2. Murri murriira marries Matha duli or any Butha.
3. Kumbo dinoun marries Butha murai or any Matha.
4. Kumbo nurai marries Butha dinoun or any Matha.
5. Ippai dinoun marries Ippatha nurai or Kubbotha duli or Kubbotha murriira.
6. Ippai nurai marries Ippatha dinoun or Kubbotha mute.
7. Ippai bilba marries Ippatha nurai or Kubbotha murriira.
8. Kubbi mute marries Kubbotha duli or Ippatha dinoun.
9. Kubbi duli marries Kubbotha murriira or Ippatha bilba.
10. Kubbi murriira marries Kubbotha duli or Ippatha nurai.

The five rules of descent connected with the marriage regulations are as follows :—

(1) The second name of both sons and daughters is always the same as that of the mother.
(2) The children of Matha are Kubbi and Kubbotha.
(3) The children of Butha are Ippai and Ippatha.
(4) The children of Ippatha are Kumbo and Butha.
(5) The children of Kubbotha are Murri and Matha.

Every child has thus two names from birth, the first of which is that of the class and the second that of the clan or subdivision, the latter being always the name of the mother. Thus—

1. The children of Matha duli are Kubbi and Kubbotha duli.
2. „ „ Matha murriira are Kubbi and Kubbotha murriira.
3. „ „ Butha dinoun are Ippai and Ippatha dinoun.
4. „ „ Butha nurai are Ippai and Ippatha nurai.
5. „ „ Ippatha dinoun are Kumbo and Butha dinoun.
6. „ „ Ippatha nurai are Kumbo and Butha nurai.
7. „ „ Ippatha bilba are Kumbo and Butha (?)
8. „ „ Kubbotha mute are Murri and Matha (?)
9. „ „ Kubbotha duli are Murri and Matha duli.
10. „ „ Kubbotha murriira are Murri and Matha murriira.

These rules have the effect of associating all the four classes among the near blood relations of an individual to whatever class he may belong.* Moreover, the names given to the child are evidently for the purpose of pointing out, not only the clan to which it belongs, but also the position in which it stands in relation to the general members of the tribe.†

* Thus, in relation to Murri, all *Murri* are his brothers, all *Kumbo* his cousins all *Ippai* his sons, and all *Kubbi* his nephews.

† According to the report of Mr Honey published in a recent number of the "Journal of the Anthropological Institute" (Vol. vii., No. 3, p. 249) the names taken by children among the Wailwun of Queensland are different from those of both father and mother, *i.e.*, they belong to classes and clans different from those of either of their parents. Among those natives it appears also that a man may marry any woman but one belonging to his own class and clan.

This is remarkable as showing that children do not always belong to the clan of their father or mother. Mr Honey says, moreover, that brothers and sisters take different animal (clan) names. The combination of this rule with the regulation that a man may marry any woman but one belonging to his own class and clan would seem to allow a man to marry his own sister. I think this must be incorrect, as it is quite opposed to the practice of the Kamilaroi tribe, and is inconsistent with the statement that the Wailwun rules of marriage and descent are "carried out in the more complete system which has been described in former reports." We cannot come to any certain conclusion as to the result of the operation of the Wailwun system until

The class name, however, must have some special signification, and its intention cannot be doubtful when we consider that it has reference to the father and not to the mother. The children of Matha are Kubbi, and they are so because Matha usually marries Kumbo, whose children, as shown by the table already given, are Kubbi. The class name of the child, therefore, is equivalent to a description of the relationship which subsists between a woman's children and their father. This is important as showing that kinship through the male was fully recognised among the Australian aborigines, which, however, is otherwise proved conclusively by the fact, observable on a comparison of the diagrams A and B, that the descendants of the father's sister stand exactly in the same relation to *Ego* as the children of his mother's brother, which is the case also with their descendants.

We are thus driven to the conclusion that the marriage restrictions of the Australians were based on the class organisation, and therefore that this was intended either to prevent marriages between consanguinei, or to point out what persons being consanguinei could intermarry. Mr. Ridley remarks that the rules of descent and marriage "prevent the intermarriage of near relations. They prohibit marriage with a sister, half-sister, aunt, or niece. They also prohibit marriage between first cousins, children of two brothers and of two sisters. But when cousins are the children of a brother and a sister respectively, the law does not prevent their union."* The fact last referred to, although explicable on the simple ground that the children of a brother belong to a different clan from the children of his sister, while those of two brothers or of two sisters belong to the same clan, is very important as showing the origin of the marriage restrictions themselves. Mr. Morgan observes that "the organisation into classes seems to have been directed to the single object of breaking up the intermarriage of brothers and sisters."† There is not, however, the slightest trace of any such custom in the Australian system, which, on the assumption (made by Mr. Morgan himself) that originally the tribes were divided into only two gentes, is perfectly explicable by the *Pŭnalŭan* custom still found among the Hawaiians, or even by the simpler custom of a man marrying several sisters or a woman several brothers. The latter custom, which Mr. Morgan supposes to be a relic of *Pŭnalŭa*, but which is more likely to be

we have much fuller details of it than are contained in Mr. Honey's report, but it will probably be found to answer exactly the same end as that of the Kamilaroi.

* "Journal of the Anthropological Institute" (1873), p. 266.

† "Ancient Society," p. 58.

its early phase, is yet practised among the American native tribes, and we know, on the authority of the Rev. Lorimer Fison, that the Australian system of relationships agrees in its eight chief characteristics with that established among not only some of the American tribes, but also the Tamil tribes and the Fijians.* If this be so, we shall not be surprised if the class division which is supposed to be peculiar to the Australians, proves to be recognised by all the systems which have reached the same degree of development as theirs. If the class names are, as I believe them to be, merely terms to express certain relationships in which the members of the tribe stand towards each other, the use of equivalent terms of relationship by other peoples is evidence of the existence of a similar division into classes. Moreover, where every individual is related to all the other members of the tribe in the same way as among the Australian natives, the class division must agree exactly with that in use among the last named race. This would imply, however, the existence of marriage regulations the same in effect as those of the Australian aborigines, having for their object the prevention of intermarriage between near blood relations. The members of the Ganowanian family have indeed an extreme repugnance to such marriages, as have also most other primitive peoples, and the agreement of the Tamil, Fijian, and other systems in their chief features with the Australian system would seem to prove that consanguinous marriages are prevented by the operation of all alike.

If the conclusion thus arrived at be correct, we shall expect to find every step in the differentiation of the classificatory relationships attended with changes in the primitive marriage regulations. Mr. Morgan, after stating that the Turanian system "could not have been formed unless *Punalúan* marriage and the *Punalúan* family had existed at the time," affirms that "the organisation into gentes was originally sufficiently influential and sufficiently universal to change the Malayan system into the Turanian."† This statement is perfectly true so far as it goes, since the prohibition of marriage between persons belonging to the same *gens*, which is an incident of the gentile organisation, would have that result. Mr. Morgan's explanation is not satisfactory, however, since it requires the differences between the relationships of the Turanian and the Malayan systems to depend on the intermarriage or non-intermarriage of brothers and sisters. He affirms, in fact, that "the change of relationship which resulted from substituting *Punalúan* in the place of consanguine marriages turns the Malayan

* "Journal of the Anthropological Institute," Vol. ii., p. 263 *seq.*

† "Ancient Society," pp. 435-412.

into the Turanian system."* Now, the evidence of the existence of Mr. Morgan's consanguine family is extremely unsatisfactory. We have already seen that Mr. Morgan seeks to support his assertion as to the former existence of the consanguine family by reference to the *Pŭnalŭan* family of the Hawaiians, and to the fact that marriages between own brothers and sisters are not unknown among them. I have, however, shown that the inference made by the American writer is not a just one, and that the *Pŭnalŭan* custom may have existed quite independently of consanguinous marriages. The theory under consideration must fall to the ground if this view is correct, and it is confirmed by the fact, admitted by Mr. Morgan,† that the family keeps in advance of the system. There is no good reason why this should be so, and it is much more probable that the system and the family agree. Such would, in fact, be the case if the Malayan system were based on the *Pŭnalŭan* family, as may well have been the case, and I shall now proceed to prove that this family would give all the relationships of the Malayan system without the need of consanguineous marriages.

Mr. Morgan shows that the Malayan system represents all the blood relationships of a consanguine family, as follows:—As all the brothers cohabit with all their sisters, each child of the complex union must be equally related to each brother, and so must every child of such children. Moreover, each sister is in some sense mother to all the children, since she is the wife of all her brothers. It is clear that the principle thus involved is applicable to all the members of the grade above that of the brothers and sisters who are thus supposed to cohabit on both the father's and the mother's side; seeing that, according to the assumption, the children of the father are those of all his brothers and sisters, and the children of the mother those of all her brother and sisters. The requirement here made that each sister should be mother to all the children is forced. Although under the conditions supposed all the children of several brothers would be brothers and sisters to each other, each father being equally the husband of all the mothers, yet these mothers can distinguish each her own children, who have clearly but one mother, although having apparently several fathers. Mr. Morgan sees this difficulty, but he endeavours to put it on one side by the unsatisfactory statement that the children of each wife would, as they all have the same husband, be step-children of the others, which relationship being unrecognised, they really fall into the category of sons and daughters. We will now see whether the relationships of the Malayan system

* "Ancient Society," p. 442.
† *Ibid.* p. 442.

may not be more easily derived from a man or several brothers marrying several sisters as exhibited in the *Pŭnalŭan* custom.

In the first place, we may refer to the fact pointed out by Mr. Morgan that, according to the Ganowanian system of consanguinity, although the children of brothers are brothers and sisters to each other, and the children of sisters are brothers and sisters to each other, yet the children of a brother and of a sister stand to each other in a different relation.* This is the same throughout all the forms of the classificatory system except those in use among the Polynesian Islanders. The existence of such a rule is positive proof that relationship is affected by clanship: since as children take the name of their mother, and a man must marry a woman of a different clan from that of his sister, their children must belong to different clans. According to the same rule the children of two sisters must bear the same clan name, and hence they will be more nearly related than the children of brothers and sisters. The nearness of relation between the children of two brothers cannot, however, be thus explained, unless it be assumed, as must have been the case originally when there were only two clans or gentes, that the wives of all the brothers belonged to the same clan. We have an example of such a case in the *Pŭnalŭan* custom, according to which several brothers married several sisters of another clan, having their wives in common. Here all the children of the complex union would take the same clan name as that of their mothers, and would therefore be classed as brothers and sisters, and would stand in the relation of children to all the parents. The same result would follow if several sisters married several brothers of another clan, and possessed their husbands in common. The several wives or husbands, as the case may be, need not, indeed, be related among themselves, except as members of the same clan, if relationship is determined by reference to a common ancestor. According to this principle, if kinship is traced through the male and female lines as among the Polynesian Islanders, not only would all the offspring of such an union as that supposed be children to the several sisters, but the children of a brother and those of a sister must also be brothers and sisters, although belonging to different clans, seeing that they have on one side the same grandparents. The same is true of the children of several sisters, and in either case, therefore, the grandparents occupy the position of common ancestors. It is clear that all the descendants from the common ancestor in the same grade will stand in the same relation to him, if not to each other. All his children are brothers and sisters, and so are all their children. Moreover, the latter are

* "Systems of Consanguinity, &c.," p. 144.

equally children to each of the persons in the grade above them, who are parents equally to all the children. Not so actually, but nominally, as in the earliest form taken by the classificatory system there was but one name for the members of each grade, and hence they must all be equally related as brothers and sisters, children and parents, or not related at all. The latter could not be, however, since they are all descended from a common ancestor, and they must be described as though actually connected by the ties of parent and child, brother and sister. This is consistent with, and would, indeed, almost necessarily follow from, the terms used to express the relationships. Thus the Hawaiian term for father is *makŭa kana*, that for mother *makŭa wahina*, meaning literally "full grown male" (or man) and "full grown female" (or woman). So also *kaikee kana* used for son, and *kaikee wahina* for daughter, mean "the little male" (or man) and "the little female" (or woman). These terms evidently do not denote any special relationship between particular individuals, and they could be used, therefore, without incongruity in reference to all the members of the same grades, although these might embrace persons standing in different relationships to each other according to our mode of expression.

If what had just been stated is correct, Mr. Morgan's explanation of the difference in the relationships recognised in the Turanian system as compared with the Malayan system cannot be the proper one.

So far from the change observable in the former being due to the substitution of *Pŭnalŭan* marriages for consanguine marriages, the Malayan system can be accounted for satisfactorily on the basis of the *Pŭnalŭan* family itself, at least combined with reference to the common ancestor. The existence of this family is, indeed, consistent with restrictions designed to prevent marriage not only between brothers and sisters, but even between more distant blood relations. The recognition by the Polynesian Islanders of kinship through the father, which is admitted by Mr. Morgan, although explained by him in accordance with his special views,* was probably intended to prevent the marriage of persons who were nearly related by blood, and yet who would be able to marry, if the primitive and simple idea of kinship through females alone operated. It is evident that if this was the only idea which regulated sexual unions, a man might marry not only his aunt or his niece, but his half-sister if their mothers belonged to different families. Moreover, if gentile relationship were the only bar to intermarriage, a woman might not only marry her half-brother, but even her

* "Ancient Society," p. 515.

own father, as he would not bear her clan name. The recognition of kinship through the male, would, however, be sufficient to prevent such alliances. When combined with the reference to a common ancestor it would form a bar to the marriage of a man with any other member of his own grade or of those immediately above or below it. Thus, where there were only two clans or gentes, a man's paternal aunt and his niece on the brother's side would have the same clan name as his wife, and therefore, if kinship through the female alone were recognised, he would be able to enter into the marriage relation with them, which he cannot do. This disability can only be accounted for on the assumption that relationship is traced not only through the mother, but also through the father, and it follows naturally from this fact.

Where, however, kinship through both the male and female lines was recognised and was treated as a bar to intermarriage, it would be necessary to supply some limitation to this disability, as otherwise marriage might be put a stop to altogether. Among the Australians that limitation is provided by the division of the people into classes, combined with an elaborate series of marriage regulations, the effect of which is that mar riage is permitted between cousins who are the children of a brother and of a sister, but not between any other near blood relations. In China, where kinship through males is fully developed, persons bearing the same family name, showing their descent from a common male ancestor, are not permitted to intermarry. The resemblance pointed out by Mr. Morgan,* and already referred to, between the Hawaiian system of consanguinity and the Chinese system of "grades of relations," justifies us in assuming that the former, like the latter, is associated with marriage restrictions. This assumption is supported by what we know of the regulations as to marriage in force among the Madecasses,† who possess the same primitive system of consanguinity as the Hawaiians. But if the intermarriage of the persons included within the grades of relatives is prohibited, this very fact implies that the restriction does not affect any person beyond those grades. The classificatory system of relationships had, therefore, we can hardly doubt, for its orignal object, the granting of facilities for marriage in derogation of an earlier system according to which, owing to the importance attached to blood relationship, legitimate sexual alliances had become difficult. Such might well have been the case with the Polynesian Islanders at an early period, when their tribes were small and composed of but few families, recognising kinship

* "Ancient Society," p. 416.

† The Samoans, Malays, and Dyaks forbid consanguineous marriages.

through the father although still influenced by the primitive idea of female kinship, and closely allied by intermarriage. Probably an invading people destroying all the men of the conquered race while reserving the woman for wives, their children would naturally take the father's name, and kinship through the male would almost necessarily be established, notwithstanding the continued recognition for certain purposes of earlier notions.

Where blood relationship through both the father and mother was recognised, the characteristics of the Malayan classificatory system, if its explanation be such as I have stated, could be accounted for even without reference to the custom of *Punalua*, which occupies so important a place in Mr. Morgan's scheme. No doubt the existence of the *Punaluan* group—that is, of a family composed of several brothers and their wives, or of several sisters and their husbands—would tend to confirm and perpetuate the Malayan system in the absence of such a counteracting force as that supplied by the gentile institution. Probaby, however, the real significance of that group is quite different from what Mr. Morgan supposes. Instead of the *Punaluan* family being the product of a very early form of marriage, it is more likely to have had a comparatively late origin. Judge Andrews says: "The relationship of *Punalua* is rather amphibious. It arose from the fact that two or more brothers with their wives, or two or more sisters with their husbands, were inclined to possess each other in common: but the modern use of the word is that of *dear friend* or *intimate companion*."* The real meaning of the word *Punalua* would seem, however, to be "having two wives;" a signification attached in the New Zealand language, as shown by Dr. William's Dictionary, to the word Púnarúa, in which *rua* is the numeral "two." Taylor says the second wife is "*pune rua*," the third wife "*pune toru*," and so on.† The same root as that here denoting wife is found in the Hawaiian *kupuna*, which signifies "ancestor," and it would seem to imply the idea of a "source" or "spring." We may suppose, therefore, that the term *Punalua* was at first applied to the case of a man having two wives or a woman having two husbands, or to that of two brothers or sisters having their wives or husbands in common. Mr. Morgan, however, states that the word is applied by a man to the husband of his wife's sister, and by a woman to the wife of her husband's brother, meaning "intimate companion," an application of the term which is evidently based on the fraternal relation subsisting between those persons and which has not

* "Ancient Society," p. 427.
† *Op. cit.* p. 331.

necessarily any reference to a sexual alliance. Curiously enough, we find that among the New Zealanders a married woman is called *he hoa*, a "friend," a title which applies also to her husband, who is called *tane*, which, says Mr. Taylor, "though literally only a man, has generally the other signification attached to it."* Now, whether the idea of friendship is associated with the alliance between a single pair, or to that between several husbands and wives in a group, it is far superior to the notion which is at the base of what we must consider more primitive phases of marriage. *Pŭnalŭa* or "friendship," implies the mutual consent and even attachment of the parties concerned, and hence it is an advance on the custom of wife-purchase, which is founded on the primitive notion of a property-right in children: a notion which, notwithstanding the late date assigned by Mr. Morgan for the origin of *wife-purchase*,† is acted on among all uncultured peoples. The existence, then, of *Pŭnalŭa* among the Polynesian Islanders, notwithstanding its polyandrous and polygynous features, is evidence of a certain amount of culture, and it is probably much more nearly allied to the marriages of affection of the more civilized races than to the consanguinous alliances of Mr. Morgan's system. As a phase of the wide-spread "brotherhood" custom it may be regarded as evidence of the development of the emotional element in man's nature, and therefore as far superior even to a monogamous union, where this is due to either the purchase or the forcible seizure of the woman who is called "wife," but who is little more than a slave. It is very probable that *Pŭnalŭa* has given rise to the institution peculiar to the Polynesian Islanders known as the *Areoi*, the origin of which I have elsewhere sought to trace to the brotherhood custom. The members of this society are, according to Gerland, "regarded already as gods upon earth," and are supposed to be elevated above all the laws of morality. These laws were not unknown to them, although not regarded, and so it doubtless was with those who practised *Pŭnalŭa*. Notwithstanding the peculiar nature of their marital alliances, they forbade marriage between near blood relations and the better to prevent such unions, or to mark how far they were to be forbidden, they classified the persons connected by blood in grades, the terms applied to which were intended, not so much to express the actual relationship between the members of the different grades, as to define the limits of their marriage disabilities. The whole classificatory system, therefore, instead of having originated in a condition of unlimited sexual license, is based on marriage restrictions

* "Ancient Society," p. 331.
† "Systems of Consanguinity, &c.," p. 491.

having for their object the exclusion of near blood relations from sexual union, or rather, was originally intended to facilitate the intermarriage of persons who, although very distantly related, were, owing to their being descended from a common ancestor, within those restrictions.

The people among whom the classificatory system originated, were no doubt at a low stage of culture, but as its "grades of relations" include the members of five generations, they could not have been described as savages. In the phase of the classificatory system, however, found among the inhabitants of Kusaie, or Strong Island, no terms exist for ancestors above father and mother, or descendants below son and daughter, which seems to show that the marriage restrictions recognised by them now only embrace three generations. This is, nevertheless, quite sufficient to prevent the intermarriage of near blood relations, and the Kusaien system is supposed by Mr. Morgan to be identical with that of the Hawaiians.* The explanation I have given of the classificatory system, renders untenable Mr. Morgan's theory of the former general practice of consanguineous marriages among the peoples who originated it, whilst the instances of such a practice cited by him are otherwise explicable. A ground of objection, however, may be found in the fact mentioned by the American writer that, "wherever the relationship of wife is found in the collateral line, that of husband must be recognised in the lineal, and conversely;" according to which rule a man calls, not only his brother's wife, but his wife's sister, his father's brother's son's wife, and his mother's sister's son's wife, "my wife," and conversely.† This curious rule, however, follows logically from that which recognises all the members of the paternal grade as parents of all those in the grade beneath, combined with the regulation according to which a brother's wife is also termed "my wife," a regulation which may have resulted from the *Punalua* custom, but which more probably is due, as already suggested, to the influence of the idea of "brotherhood." But Mr. Morgan would probably refer to an Australian custom which seems to support his view of the meaning of the use by the Polynesians of the term "wife." He states, on the authority of Mr. Lance, that if a member of the Kubbi class met a woman of the Ippatha class, he would treat her as his wife, and that "his right to do so would be recognised by her tribe." Mr. Morgan asserts that "every Ippata within the immediate circle of his acquaintance would consequently be his wife as well." He further infers that, "under the conjugal system thus brought to light, one quarter of all the males are

* "Systems of Consanguinity, &c.," p. 459.
† "Ancient Society," p. 412.

united in marriage with one quarter of all the females;" a scheme of intermarriage which, he adds, is but a step from promiscuity, although being a subject of organic regulation it is far removed from general promiscuity.* It might be objected to this reasoning that, however true in theory may be Mr. Morgan's explanation of the Australian system, the conjugal right referred to could seldom, if ever, be reduced to practice. Apart from the jealousy of the Australian natives as among themselves, all their females are at an early age appropriated by exchange or purchase by the old natives. The probability is that, in the case mentioned by Mr. Lance, the woman of the Ippata class could be treated by the Kubbi man as his wife only if she did not already belong to some other man in that capacity, which would reduce the case to the ordinary one of every Kubbi being allowed to form a temporary or permanent sexual alliance with any Ippata, assuming that she was not already married. When, moreover, we consider that Ippata is "cousin" to Kubbi, the Australian system is seen not to be so barbarous as Mr. Morgan imagines. We may, therefore, believe that the Polynesian use of the term "wife," in the cases referred to by Mr. Morgan, has a different explanation from that given by him, and in relation to collaterals, it is probably applied rather in the sense of "friend" than with any sexual intention.

It remains now for me only to notice the explanation of the origin of the classificatory system of relationships given by two English writers.

In the first place, Sir John Lubbock ascribes so much importance to the action of the tribal organisation over the primitive institutions of mankind as to make it the very basis of the classificatory system. He says that: "Children were not in the earliest times regarded as related equally to their father and their mother, but that the natural progress of ideas is, first that a child is related to his tribe generally; secondly, to his mother and not to his father; thirdly, to his father and not to his mother; lastly, and lastly only, that he is related to both."† It is uncertain in what sense the term "tribe" is here used. If it is intended to express the same idea as "clan," or large family group, facts already pointed out by Mr. Morgan prove the insufficiency of Sir John Lubbock's explanation. Mr. Morgan shows that, "when the tribal relationships are run parallel with those established by the system, that the former traverse the latter quite as frequently as they affirm the connection." He adds that "in some Indian nations descent is in the male line,

* "Ancient Society," p. 54.

† "Origin of Civilization," 3rd Ed., p. 113; "Journal of the Anthropological Institute," Vol. i., p. 25.

in which cases the tribal relationships, as above given, would be reversed; in others it does not now exist, and yet the same system of relationships prevails amongst them all alike, irrespective of the existence or non-existence of the tribal organisation, and whether descent is in the male or female line."* The facts thus stated by Mr. Morgan show conclusively that the classificatory system cannot have been based simply on the clan organisation and the relationship to the clan. If by "tribe" Sir John Lubbock means a group of persons forming together but one family, the case is no less difficult. We have examples of such a large family group in some of the Chinese villages, all the inhabitants of which bear the same family name. But this is not a case in point, as marriage among the inhabitants of such a village is not permitted, whereas Sir John Lubbock's hypothesis would require the greatest freedom of intermarriage. It would require more than this, as the only relationship recognised in the primitive family group supposed, would be that of the tribe itself; a relationship founded on the practice of promiscuous intercourse between the sexes. On this subject I will say merely that the evidence in favour of the former existence of such a practice is, apart from the classificatory system of relationship itself, of the very weakest description. In his later work, Mr. Morgan, after referring to Mr. Darwin's opinion on the subject, says: "It is not probable that promiscuity in the primitive period was long continued even in the horde, because the latter would break up into smaller groups for subsistence, and fall into consanguine families. The most that can safely be claimed upon this difficult question is, that the consanguine family was the first organised form of society, and that it was necessarily an improvement upon the previous unorganised state, whatever that state may have been."† This is practically an admission that there is no evidence of any period when the sexual condition of mankind was one of promiscuous intercourse. Mr. Morgan certainly insists that the existence of the consanguine family requires such a condition as its forerunner. This position might be contested, but if the explanation I have given of the origin of the classificatory system of relationships is correct, it is valueless, seeing that there is no evidence of the consanguine family having ever existed as a general condition of social organisation.

In conclusion I have only to notice the explanation of the classificatory system given by Mr. McLennan, who describes it as a "system of mutual salutations merely," although from its being connected with the family, its phenomena, and therefore

* *Op. cit.* p. 476.
† "Ancient Society," p. 418.

also its origin, must be "ultimately referable to the marriage law."* The marriage law to which Mr. McLennan refers the origin of the system, is that of the ruder form of polyandry found among the Nairs. As stated by Mr. McLennan, its explanation is as follows: "A necessity or convenience for classifying kindred united in families, while as yet husbands and wives did not live together within the same family."† This explanation, although ingenious, is not in accordance with fact, as it supposes not only that the wives continue to live under the maternal or fraternal roof, but that kinship is traced through the mother alone, whilst in reality the peoples using the Malayan system trace kinship through the father as well as the mother. This fact is fatal to Mr. McLennan's hypothesis, which requires kinship to have originally been traced through females only.‡ In opposition to this view, Mr. Morgan remarks, "The Turanian, Ganowanian and Malayan systems of consanguinity show plainly and conclusively that kinship through males was recognised as constantly as kinship through females."§ In the present paper I have shown that this is true in relation to the actual conduct of the Polynesian peoples, and it must be so wherever the wife leaves her father's house to reside in that of her husband. It might be different where the husband goes to reside among his wife's family, although not necessarily so. According to Mr. Taylor,‖ such a practice is common among the New Zealanders, and it doubtless originated in the desire to increase the strength of the tribe to which the wife belongs, by retaining her children within it instead of transferring them to another tribe, as would result from the New Zealand practice of tracing kinship through the male if the woman goes to reside among her husband's family. The idea on which that practice is based—the ownership of children—is quite distinct from the kinship through females only, which Mr. McLennan's hypothesis requires, and which he assumes to be connected with the Nair form of polyandry. It is difficult indeed to imagine how the Nair form of polyandry, considered as a primitive institution, can have originated. The descent of the family may be traced back to a common mother, but her children must have had a father, and, unless we suppose mankind to have subsisted from the very first in groups answering to the Nair family, there must have been a time when the family had a male as well as a female head. In this primeval family we cannot doubt, judging from

* "Studies in Ancient History," pp. 366–372.
† *Ibid.* p. 391.
‡ *Ibid.* p. 379.
§ "Ancient Society," p. 515.
‖ "Te Ika A Maui," p. 337.

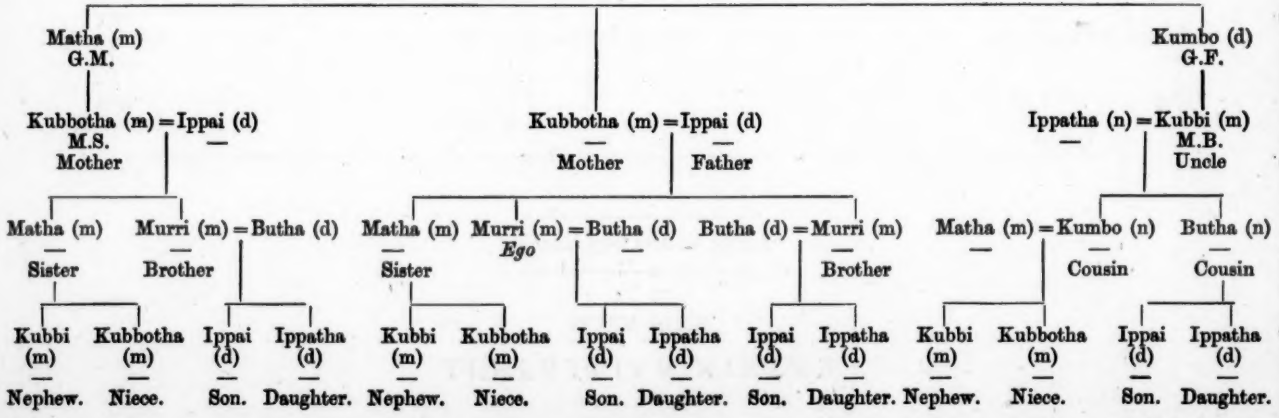
analogy, that the man was the real head, and most probably he treated his female children, when they were allowed to live, as articles of property, and either gave or sold them to other men as slave-wives, or retained them for the purpose of increasing the number of his family by their children. Possibly he may have permitted them to accept the embraces of any man who was able and willing to make him a return in labour or otherwise, and in this case paternity would often be uncertain. Kinship through the female only might arise in that way, and in that way alone, but the case thus supposed is totally different from that supplied by the Nair form of polyandry. In whatever way it originated, however, the clan or gentile institution will not give all the relationships of the classificatory system, and therefore kinship through the female, on which the primitive clan is based, cannot do so. If it would give those relationships, the earliest form of the classificatory system must be that associated with the gentile institution as found developed among the Turanian and Ganowanian tribes. Such a conclusion would, however, require that the phase which is preserved by the Polynesian Islanders, and which both Mr. Morgan and Mr. McLennan assume to be the most primitive, must in reality be a later form, due to the growth of the idea of kinship through the father. Something might be said in support of this view, but it need not now be discussed. For my part, whichever phase of the classificatory system may ultimately be found to be the most primitive, I have no doubt that, although kinship may for certain purposes have been originally traced through the mother, the regulations as to marriage were based on the relationship of a father to his child, and that the ideas which gave rise to those regulations also originated the classificatory system of relationships.

A.

AUSTRALIAN SYSTEM.

FEMALE STEM.

MURRI, *Ego*, marries BUTHA.

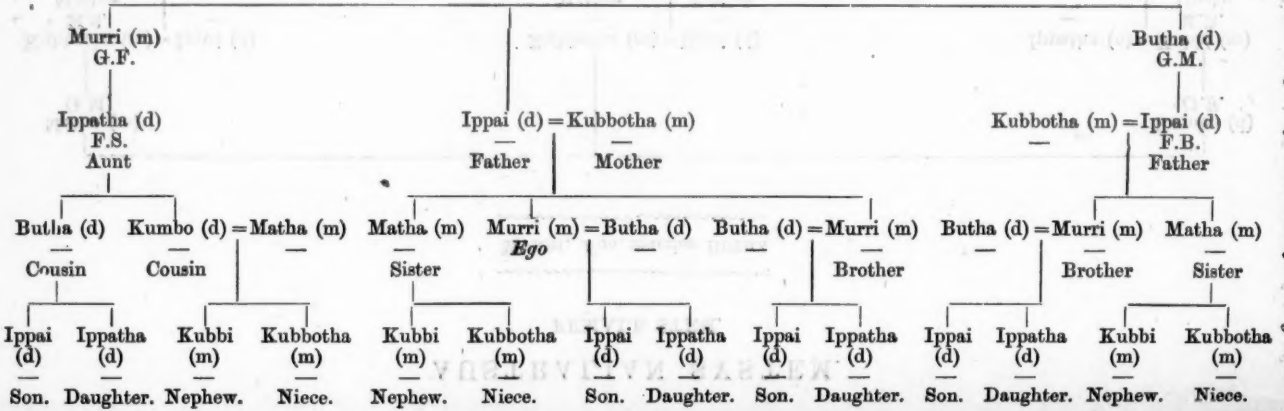


B.

AUSTRALIAN SYSTEM.

MALE STEM.

MURRI, *Ego*, marries BUTHA.

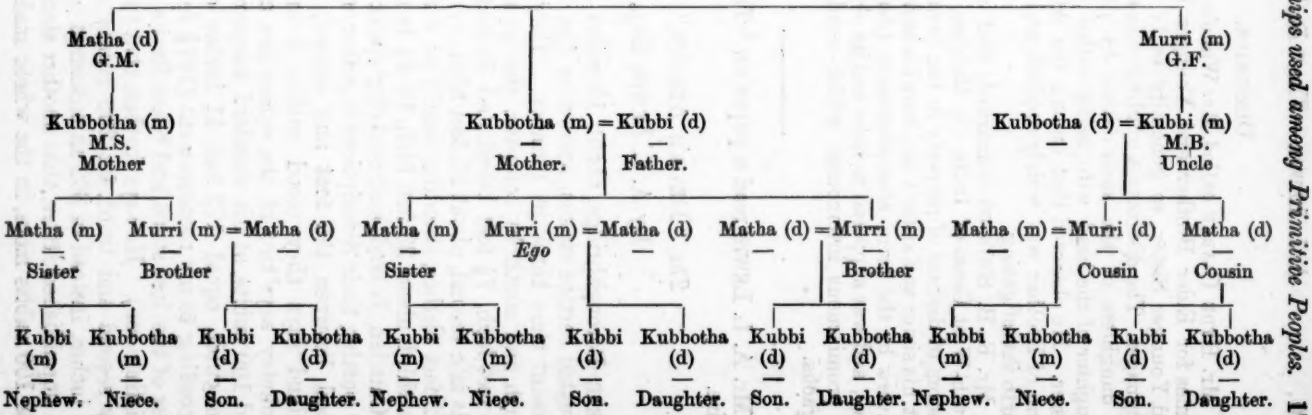


C.

AUSTRALIAN SYSTEM.

FEMALE STEM.

MURRI, *Ego*, marries MATHA.



DISCUSSION.

Mr. HYDE CLARKE called Mr. Wake's attention to the distinct names for Elder Brother and Younger Brother and Elder Sister and Younger Sister, so generally to be found in the pre-historic languages. The distinction might perhaps properly apply to the sons or daughters of the same father by different wives, a son and daughter of the head wife being called Elder Brother and Elder Sister. He observed that among the Albanians or Arnaouts the term of Brother was widely applied, and that the association was worth investigating.

Mr. R. B. SWINTON remarked, that among the people on the South-West Coast of India (in Malabar and Cavara), there was a custom of descent of property in the female line; not a man's son, but his sister and sister's son were his heirs. This was lawknown in Cavara by the term aliza-santanam (descent through the son-in-law), and was supposed to have had its origin from a former practice of promiscuous intercourse which rendered male parentage ambiguous.

Mr. A. L. LEWIS read a paper on "The Devil's Arrows," Yorkshire.

The "DEVIL'S ARROWS," YORKSHIRE.

By A. L. LEWIS, Esq., M.A.I.

NEAR Boroughbridge, about 15 miles north-west of York, are situated certain stones, known as the "Devil's Arrows," at the present time three in number. They stand in a line nearly north and south by compass, the most northerly being about 18 feet high, 7½ feet broad, and 3½ feet thick; 197½ feet from this is a second, about 22 feet high, by 4½ broad and thick; and 362 feet farther, standing nearly on the brow of a slight hill, is the third, about 23 feet high, by 4½ broad, and 4 thick.

Camden, Leland, and Stukeley speak of a fourth stone, which, by putting their descriptions together, may be supposed to have stood between the first and second, and close to the latter. Leland says they stood within 6 or 8 feet of each other. Stukeley says two of the stones are exactly 100 cubits apart, and 100 cubits, at his standard measurement of 20¾ inches to the cubit, equal 172 feet 11 inches only, against about 187 according to my measurement (197½ feet, less 4½ for the thickness of the lost stone, and 6 feet for its distance from the second existing one). He says further, that two more stones, doubtless my second and third, are 200 cubits asunder, that is 345 feet 10 inches, instead of 362 as measured by me. Again, he says in an unpublished letter, that another stone, now (1740) carried off, was 100 cubits more, in the whole making 400 cubits distance.

This stone would obviously be in prolongation of the present line southwards. It will be seen that there is a considerable difference between Stukeley's measurements and mine; but I am not the only one who has had occasion to differ from him as to facts and details concerning these monuments, and after comparing a number of his measurements, given both in feet and cubits, I have come to the conclusion that the feet represent his view as to the actual measurement, and the cubits his view as to what the distance was intended to be or ought to have been. That his cubits were only approximate in the present instance may be judged from the fact that even if we suppose his 100 cubits, 200 cubits, and 100 cubits, making in all 400 cubits, to be taken from the centre of the stones, so as to omit their thickness, the distance between the lost stone and the second existing one, and half the thickness of both these, say 10 or 12 feet in all, must either be added to his 400 cubits, or subtracted from the 100, the 200, or the second 100 cubits.

The arrangement of the stones past and present will be understood from the following diagram:—

Stones now remaining.

* * *

Stones as they are known to have existed.

* [*a*] * * * *

The next points for consideration are naturally the probable date and object of this monument.

The Rev. W. C. Lukis, whose opinions on rude stone monuments must always command the most respectful attention, and to whom I am indebted for valuable information respecting these very stones, read a paper before the Society of Antiquaries, a short time ago, in which he suggested that the stones were the remains of a series of lines, like those of Carnac, a view which I do not at present see sufficient reason for adopting. A series of avenues of stones at an ordinary distance from each other, and extending more than 700 feet in length, and a proportionate breadth, would require some hundreds of stones, none of which would have been very small if we may judge from those left, and I cannot believe, without further evidence than is afforded by the known destruction of two stones in two centuries, that

all these would have been removed, leaving no trace behind except the three survivors. Mr. Lukis informs me, however, that he is going to survey the country round thoroughly, to see if he can find any indications of other stones, and it is but right to wait the result of his search before giving a final opinion on this question.

While contending stoutly for the pre-Roman and probably Celtic origin of the stone circles and dolmens of our country, I should be disposed to listen favourably to any evidence that might be brought forward for a Scandinavian authorship for the "Devil's Arrows." There seems to be some reason to believe that the Scandinavians did erect stones in commemoration of battles, and there is no part of Britain in which we might more expect to find such a Scandinavian monument than in Yorkshire. The monument, as it is known to have stood, is very nearly symmetrical, and of a very different character from those which I have always held to be British; the addition of a single stone at the point marked [*a*] in the diagram, would make it perfectly symmetrical, by matching the two stones which are known to have stood close together, but those two might have been placed so to mark some special point in the battle (if battle there were), and I do not therefore insist upon the existence of even one other stone. I am not aware that any sepulchral deposits have been found here. If so they would perhaps settle the date. If not, it might be inferred that no battle had taken place here.

The stones themselves are of a soft grit, full of tiny pebbles, and the rain has worn long and deep channels on all sides of them, narrowing from the top downwards. These channels have been mistaken by at least one antiquary for artificial "flutings," but that they are waterworn channels is evident from their running straight down two slanting sides of a stone which leans, and from their being very long on the uppermost (third) side, and very short on the overhanging (fourth) side of the same stone.

These stones being of great size, questions naturally recur as to the means by which they were carried to and erected on their present site, and I may therefore be excused for repeating an account which I have received, but have never seen in print in this country, of the manner in which these things are done by some of the hill tribes of India.*

A stone having been selected from some place where there

* This account was given by Mr. Greey, C.E. (since deceased) to the late Dr. Inman, who sent it to me for publication. I sent it to the "Materiaux pour l'Histoire Naturelle et Primitive de l'Homme" (April, 1876), but have seen no notice of anything of the sort in English.

are natural cracks, into which levers and wedges may be introduced, is split from the parent rock by those instruments, and moved on rollers till its weight is transferred to two or three straight tree trunks cut for the purpose, under which strong bamboos are placed crosswise, which again rest on a number of smaller bamboos, and these again upon others, if the stone be very large, the smallest being far enough apart to allow a man to stand between them. All these being lashed together at each crossing, form a simple but substantial framework, which may be made of such size as to allow a sufficient number of men to grasp, lift, and transport it and its burden, so that a stone weighing twenty tons has been known to be carried up a hill 4,000 feet high in a very few hours. It has been calculated that three or four hundred men could in this manner transport either of the "Devil's Arrows" any distance that might be wished.

On reaching the spot where the stone is to be erected, a hole is dug of sufficient depth to keep it steady, into which one end of the stone is allowed to slide, ropes are then attached to the framework, on which the other end still rests, and by hauling at them the stone is quickly set up.

These operations, based as they are upon a sound natural principle, are yet so simple and so well suited for a state of society in which unskilled labour is very plentiful, that we may readily believe them to have been carried on in our own country. There might be some difficulty in getting a stone perfectly perpendicular in this way, and that may be one reason why so many are found leaning, and why so many others, which were doubtless more or less upright in the first instance, have fallen altogether.

May 14th, 1878.

Mr. John Evans, D.C.L., F.R.S., *President, in the Chair.*

The minutes of the previous meeting were read and confirmed.

The following presents were announced, and thanks were ordered to be returned to the respective donors for the same.

FOR THE LIBRARY.

From the SOCIETY.—Jahrbuch der K.K. Geologischen Reichsanstalt. Vol. XXVII, Nos. 3–4; Verhandlungen, do. Nos. 11–18.

From the ANTHROPOLOGICAL SOCIETY of VIENNA.—Mittheilungen der Anthropologischen Gesellschaft. Vol. VII, Nos. 7–12.

From the EDITOR.—Revue Internationale des Sciences. Nos. 18–19.

From the ASSOCIATION.—Journal of the Royal Historical and Archæological Association of Ireland. Vol. IV, Nos. 31–32.

From the AUTHOR.—Mémoire sur la Nomenclature Cérébrale. By Dr. Paul Broca.

From the SOCIETY.—Giornale di Scienze Naturali ed economiche. Vol. XII. Palermo, 1877.

From the SOCIETY.—Proceedings and Reports of the Royal Society of Tasmania for 1876.

From the EDITOR.—Materiaux pour l'Histoire de l'Homme. March 1878.

From the AUTHOR.—Uber das Skopzenthum in Russland nebest Historischen notizen. By Dr. E. Pelikan.

From the INSTITUTION.—Journal of the Royal United Service Institution. Vol. XXII, No. xciv.

From the ACADEMY.—Bulletin de l'Académie Impériale des Sciences de St. Petersbourg. Tome XXIV, No. 4.

From the EDITOR.—Revue Scientifique Nos. 44–45, 1878.

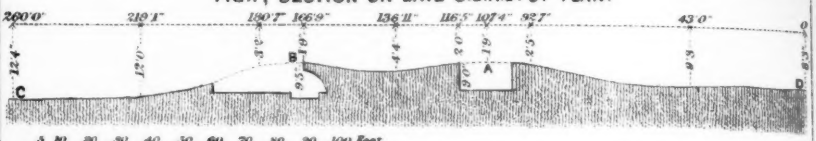
From the EDITOR.—"Nature" (to date).

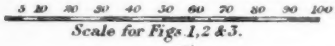
A paper was read by Prof. ROLLESTON, M.D., F.R.S., entitled "Description of a Male Skeleton found at Cissbury." This will appear in a future number.

Capt. HAROLD DILLON, F.S.A., exhibited a series of Flint implements, collected in the neighbourhood of Ditchley, Oxfordshire; and a number of others from the Drift Gravel of the Lea Valley, near Clapton, were exhibited by Mr. WORTHINGTON G. SMITH, F.L.S.

Professor ROLLESTON also presented the following report on Excavations at Sigwell in Somerset, prepared for the meeting of the British Association at Plymouth, in August, 1877:—

FIG. 1, SECTION ON LINE C.B.A.D. OF PLAN.





Scale for Figs. 1, 2 & 3.

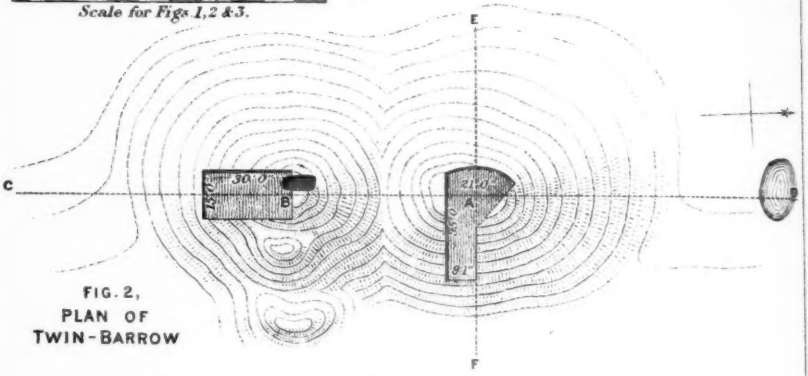


FIG. 2,
PLAN OF
TWIN-BARROW

FIG. 3, SECTION ON LINE E.A.F. OF PLAN.

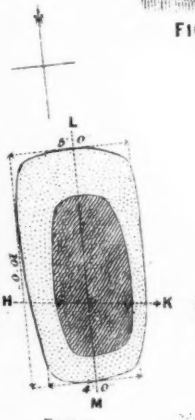


FIG. 4,
PLAN OF GRAVE

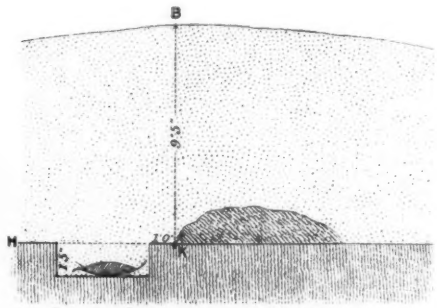


FIG. 5, SECTION ON H.K. OF GRAVE

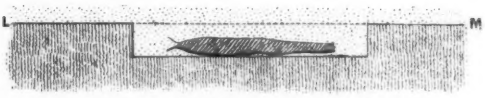
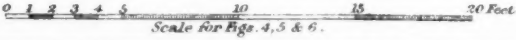


FIG. 6, SECTION ON L.M. OF GRAVE

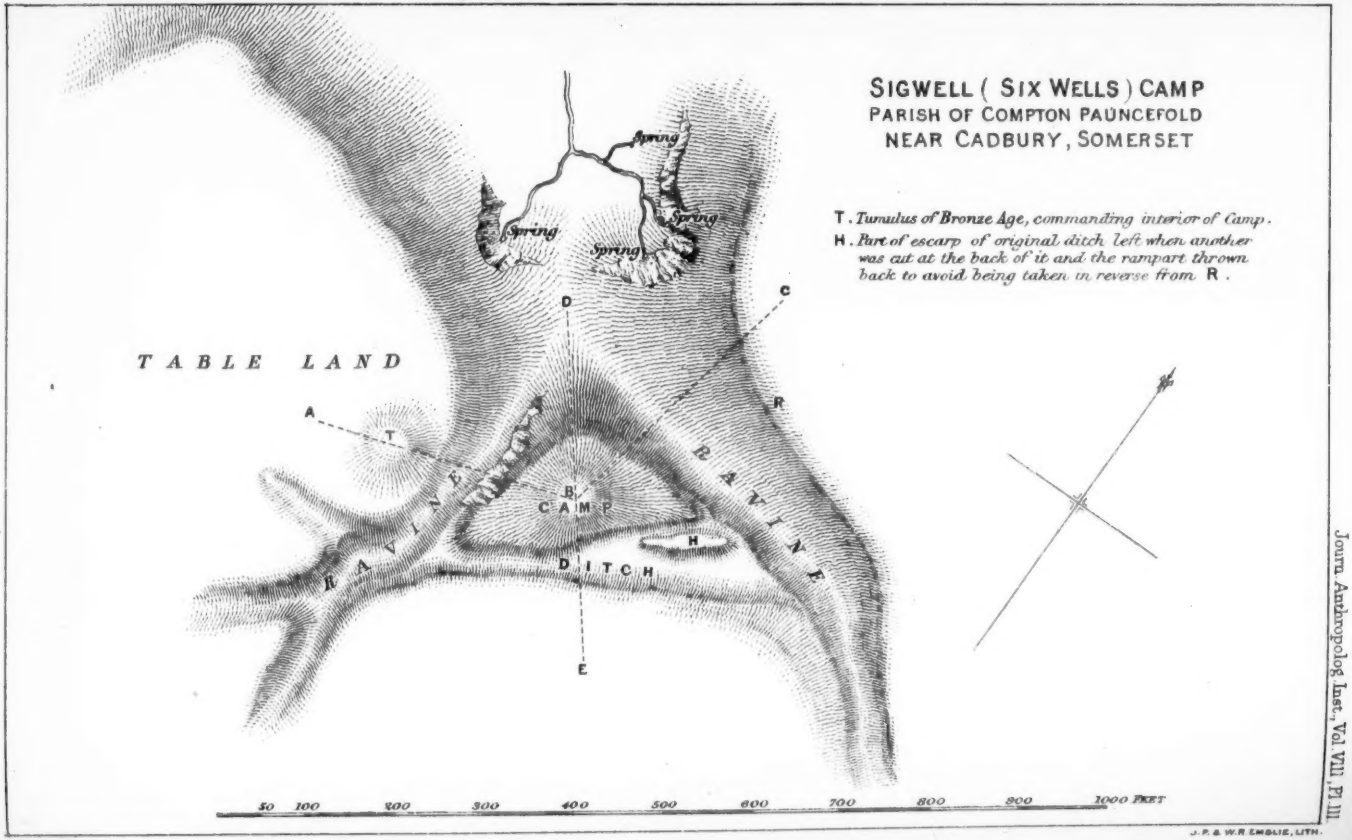


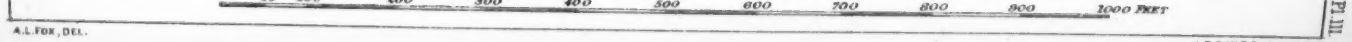
Scale for Figs. 4, 5 & 6.

EXPLANATION

A.L.FOX, DEL. J.P.& W.R. EMSLIE, LITH.

SIGWELL TWIN-BARROW, EXCAVATED JULY, 1877.

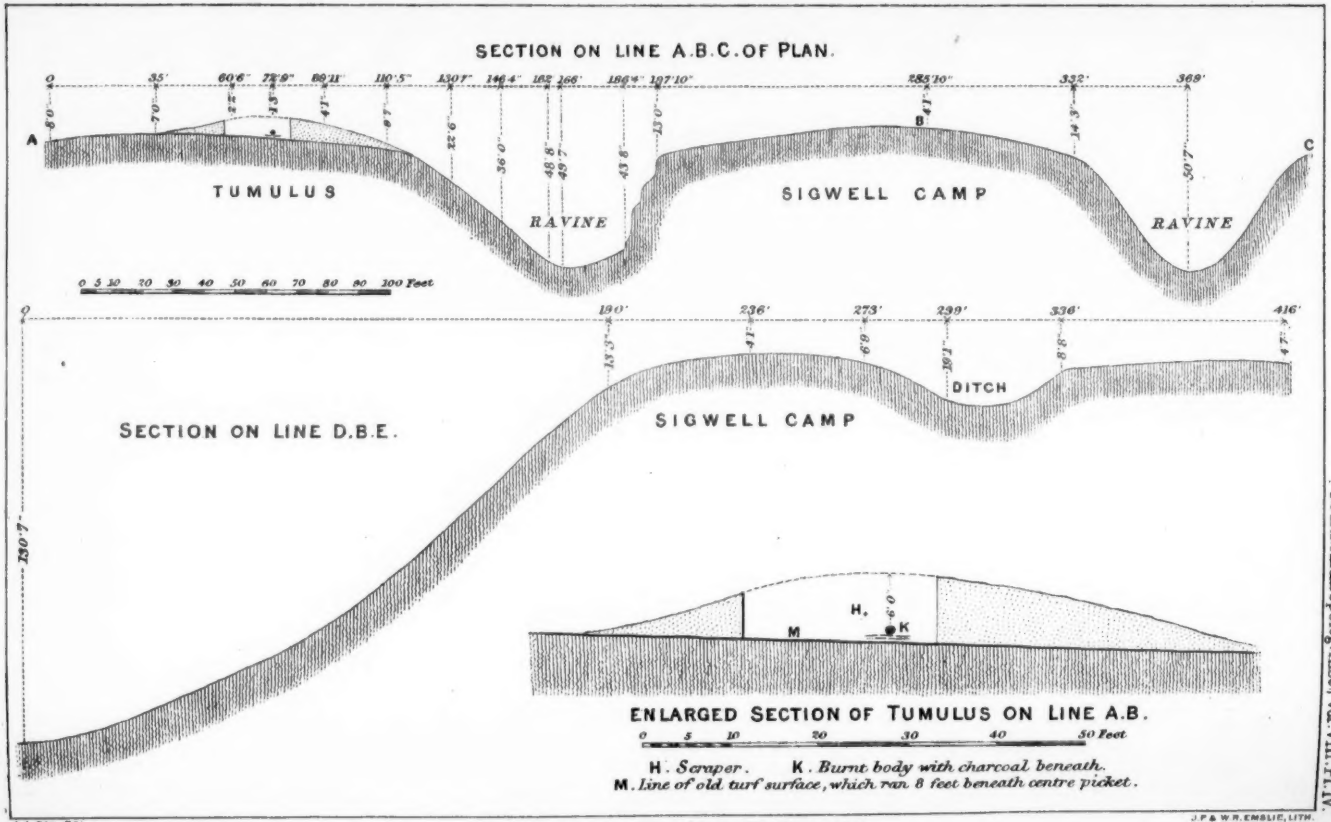

SIGWELL (SIX WELLS) CAMP
PARISH OF COMPTON PAUNCEFOLD
NEAR CADBURY, SOMERSET
T. Tumulus of Bronze Age, commanding interior of Camp.
H. Part of escarp of original ditch left when another was cut at the back of it and the rampart thrown back to avoid being taken in reverse from R.
Spring
Spring
Spring
Spring
TABLE LAND
A
T
D
C
R
RAVINE
RAVINE
B
CAMP
H
DITCH
E
50 100 200 300 400 500 600 700 800 900 1000 FEET
A.L.FOX, DEL.
J.P. & W.R. EMSLIE, LITH.



PL. IIII.

A.L. FOX, DEL.

J. H. & W. H. EMSLIE, LITH.



SIGWELL CAMP AND TUMULUS

Journ. Anthropolog. Inst., Vol. VIII. Pl. IV.

REPORT *of* EXCAVATION *of a* TWIN-BARROW, *and a* SINGLE ROUND BARROW *at* SIGWELL (SIX WELLS), PARISH *of* COMPTON, SOMERSET. By PROFESSOR ROLLESTON, M.D., F.R.S., *and* MAJOR-GENERAL A. LANE FOX, F.R.S. *With an* APPENDIX *on the* TOPOGRAPHY *of* SIGWELL. By MAJOR-GENERAL A. LANE FOX.

THE following account of the examination of three round barrows at Sigwell, in the parish of Compton, Somersetshire, two of which were in juxtaposition and may be spoken of as a twin-barrow, whilst the other stood apart from any other barrow, but overlooked what we hold to have been a camp of an earlier period than these barrows, throws light upon the following questions.

Firstly, it shows that in the Bronze Age, and amongst men who were practising cremation, considerable variety existed as to the mode of their disposing of the dead. In the two burials discovered no urn had been employed, and the bones had been picked out of the pyre and placed apart, one set in a bark coffin, the other simply in a separate place in the soil of the barrow. Yet in one of the barrows pottery was found of a kind which showed with some probability that urn burial was not unknown to the original constructors of the barrow.

Secondly, the measurements of the entire mass of each barrow, as compared with those of the very small spaces in which the burned bones were contained, in one case within a circle of six inches radius, will show how exceedingly easy it must be to overlook the existence of such a burial, and how cautious we should be in asserting that nothing can be found in such mounds to serve as their *raison d'être.*

Thirdly, the relative position and elevation and other peculiarities of one of these barrows, that to be hereinafter spoken of as "Sigwell iii," and of a small British camp which we believe the area labelled B on the plans to have been, show, as we believe very unmistakably, that the camp was earlier in point of date than the barrow, and the work of stone-using, not of bronze-using, men.

This exploration was undertaken at the suggestion of the Rev. J. A. Bennett, the rector of the neighbouring parish of South Cadbury; and to his other suggestions on many points, and to his help throughout, we are greatly indebted.

The British Association gave us a grant towards the defrayment of the expenses, and the following report was read before the Plymouth Meeting in August, 1877.

"Sigwell i," July 18, 1877, Tuesday.—The examination of the twin-barrow was begun by opening the tumulus situated to the north ("Sigwell i." Pl. 1, fig. 2, A) by a trench 9ft. 1in. wide from the east side.

The natural soil, lias sand, was of a light yellow colour with concretions of a small size and somewhat darker hue intermingled with it, and was readily enough distinguishable from the made earth of the barrow, which was darker in colour owing to finally divided carbonaceous matter, and was also more loosely compacted. The natural soil was 5ft. below the top of the barrow at its eastern edge, and 9ft. below it at its centre. When the excavation had passed the centre westward, it was opened out northwards to a length of 21ft..

July 19, Wednesday.—A great deal of charcoal was found about 4ft. above the natural surface at the centre; and at a depth of 1ft. 6in. from the natural bottom, and 7ft. 6in. from the surface under the centre picket, a well formed flint "scraper" or "strike-a-light" was found. And in all about 20 fragments of worked flint were found in this barrow, some of them with *patina* upon them, and some with rose-coloured staining (from manganese?), but most retaining the black surfaces of their original fractures unchanged, and showing thereby that they were chipped during, or only shortly before, the erection of the mound, for the purpose of funeral ceremonial. But in this northern part of the twin-barrow we found no pottery, no bronze, no interment; and the flints, such as they were, were much fewer in mere numbers than in either of the other two barrows to be hereafter described. Our failure to find any interment may be explained by the fact that this mound was very extensively burrowed into by badgers, foxes, and rabbits; and if the interment had been contained within as small a compass, and had consisted of such easily scatterable materials as those contained and discovered in the two other mounds, it is easy to see how it might have been entirely dispersed and destroyed.

"Sigwell ii," July 20, Thursday.—We commenced upon the southernmost of the two halves of the twin-barrow (Pl. 1, fig. 2, B), driving a trench 15ft. wide from east to west, beginning along a line 30ft. south of the line of the centre picket, but some little way, as the plan will show, from the actual southern boundary of the barrow. Some excavation had been made, either for the sake of investigation or for digging out rabbits, fox, or badger, on the south-east side of the barrow; the earth disturbed by this operation had been partly thrown out eastwards, partly filled in again; through the westward part of the disturbed soil we dug, and found that the diggers had not gone very far down and had left a "steel" for striking a light and a piece of glazed pottery in their "filling-in." We came upon the natural surface at a depth of 9ft. 10in., as in the northern barrow, the ground and the mound being of the same distinctive character as regards each other.

A piece of British pottery (labelled "Sigwell ii a.") was found 15ft. 6in. to the south-west of the centre picket, and 9ft. 10in. below the surface. It had been apparently the bottom of a jar or urn, and may possibly indicate that an urn burial had taken place in this barrow before the one we had to deal with. The distal half of the metacarpal or metatarsal of a sheep or goat was found about 5ft. down in the barrow near to the centre picket. It was a good

deal decayed, but one of the phalanges was found in relation with it.

3ft. 8in. to the west of the centre picket (Pl. 1, figs. 1, 2, 4, 5, and 6) we found a grave 1ft. 6in. deep in the natural soil, 10ft. long, 5ft. wide at the north, 4ft. wide at the south end, its long axis due magnetic north and south, that of the tumulus itself being about north 5° east. The eastern end of the grave was 7ft. to west of the centre picket, 3ft. 10in. of the length of the grave being to the south of the centre, and the remaining 6ft. 2in. to the north. In this grave was contained a bark coffin, inside of which was a bronze dagger, and a quantity of very thoroughly burnt small fragments of human bones. The longest diameter of the largest of these fragments being only ·9in., it is difficult to say more than that this fragment, being apparently a part of that portion of the occipital bone which is known as the *Torcular Herophili* (the very same portion of bone as that which was found in the deposit of La Tiniére, and one which possesses a singular power of resisting various destructive agencies), probably belonged to a young male subject. With this and one or two more fragments of skull there were some fragments of the long bones. With the white fragments were mixed up here (as also in "Sigwell iii" to be hereafter described) masses of bones so burnt and so broken up as to present an Oxford grey colour from the intimate intermingling of their white with their carbonised factors. With the bones were mixed up inside the oak bark coffin some flint flakes labelled "Sigwell ii c;" but not a single fragment of charcoal. It had been made of two pieces of bark, which had been fastened together at the sides, so as to leave two free ends projecting freely, not wrapped round each other. But in one section drawn by General Lane Fox (Pl. 1, fig. 5), the upper bark cover having been shorter than the lower, this latter simply curves round its free edge. As the ensuing description will show, the lower piece of bark must have been laid upon the ground, and the bones from the pyre or ustrinum must have been brought to it and placed upon and along it together with the earth and the bronze dagger, and the flints which were found inside the coffin by us. The upper piece of bark was then put over the entire mass of contents, and the rest of the barrow piled over them.

The coffin's east edge was nearer the east border of the grave than its west edge was; at this edge it was about 1ft. 2in. short of the grave's boundary. Its length was, from south to north, about 7ft.; in working from south to north we had cut away the south end of the coffin before we were aware of it, so that we cannot say with perfect certainty where its south end began, but as its north end was detectable 2ft. from the north end of the grave, the entire length of which was only 10ft., this is of no great consequence. The width of the coffin was from 34in. to 36in.; its depth in the middle line about 6·5in. (Pl. 1, fig. 4).

The contents of the bark coffin contrasted very strikingly with the made earth of the barrow above, with the natural soil into which the grave was sunk on either side, and thirdly with the soil

from the grave itself, which had been thrown up on the east side of the grave as seen and shown in the section. The soil within the coffin was lighter a good deal than the made earth of the barrow, the intermingling of which with fairly divided carbonaceous matter had made it in places very dark; but was much less light than the natural ground into which the grave was sunk. But it is of great importance to note that in the soil inside the bark coffin no fragments of charcoal sufficiently large to be detected with the naked eye were visible; as hence we see that the body was burnt some distance away from the grave, and that the burnt bones were picked up out of the ashes and carried to the grave separately,* being distributed as deposited throughout the entire length of the coffin examined. The upper bark was much thinner than the lower, the lower being as much as seven-eighths thick, whilst the upper was as little as one-fifth to one-fourth. The upper piece had split in some places and the sand had worked away into the space left empty. *In situ*, the layers of the bark towards the interior were black, and the outer reddish; but, on drying, the reddish colour is in many pieces the colour throughout the entire thickness of the bark. Microscopic examination showed no dotted cells, and the Scotch fir is thereby excluded, but it is possible that it may have come from the Wych elm. Its structure, however, had been made exceedingly difficult to examine by the ravages of a fungus.

In this coffin, together with the bones and the two or three flint chips, was a bronze dagger with three rivets, 6·5in. long from proximal rivet to point. It was much decayed, and did not rest on the bottom of the coffin, but was separated from it by a considerable thickness of dullish yellow sand. Its point was broken away for a length of 7·10in. and this part was brought away on a piece of the hardened sandy earth. This lump of earth is preserved with a little of the crumbled-away part of the point adherent to it; the greater part of the point, however, has been attached, together with the rest of the blade, to a piece of cardboard. The lamina which held the rivets has broken up, and the small fragments of bronze diffused throughout the soil in the bottle labelled "Sigwell ii b," represent it.

The dagger lay near the southern end of the grave, about 2ft. from the end; its pivot end was at the south, its point at the north. An interment which must have been of a somewhat similar character is described by Mr. Spence Bate, F.R.S., in the Transactions of the Devon Association, Vol. v. 1872, p. 555–556. There "a mass of comminuted bones mixed with earth, instead of being enclosed in an urn, were found lying closely placed together in one spot beneath the stones." And in the earth that was carted home, "besides a quantity of bits of bone, was found the blade of a bronze dagger."

"Sigwell iii" (Pl. 2, T, and Pl. 3), Monday, July 23.—Commenced

* For the picking up of burnt bones see Max Müller, Die Todtenbestattung, Zeitchrift Deutsche Morgehland. Gesell. vol. ix., p. 17. Colebrooke, "Life and Asiatic Researches," Vol. ii. *ibique citata.*

work with seven men upon the barrow to the south-west of Sigwell camp, lettered T upon plan, by cutting a trench 17ft. long and 12ft. 6in. wide on line A B of plan, and to south-west of centre picket. This barrow resembled the two already described as "Sigwell i" and "ii" in the material and mode of its construction; in containing burnt bones which had been picked out of the ashes of the fire in which the body they belonged to had been burnt and buried apart; and in containing fragments of coarse pottery, it resembled "Sigwell ii," but differed from it in not furnishing any specimen of bronze, and in, perhaps by way of compensation, furnishing a very large number of worked flints, some black, others whitened on their fractured surfaces, and in containing a small fragment of a patterned drinking cup or food-vessel, and in containing a very much larger quantity of human burned bones as well as two large fragments of unburnt bones, an *os innominatum*, to wit, and a piece of a femur.

Among other important lessons taught by the history of this barrow, one of special importance is the ease with which it is possible to miss an interment when that interment lies within a circle of half a foot radius, and consists only of a small quantity of either very finely comminuted or all but pulverised burnt bones.

A good scraper, labelled "Sigwell iii c," was found 3ft. 5in. south-west of the centre picket and 4ft. 7in. below the level of it. All through this barrow worked flints were found in much greater abundance than in either of the other two. I was inclined to connect their presence in this quantity with the absence in this barrow of any rabbit-holes, supposing that a rabbit in burrowing would be likely to throw out a worked flint rather than an equivalent mass of sand for obvious reasons, mechanical and other. But I should not press this view.

Exactly beneath the centre picket, and 6ft. below it, was a mass of burnt bones occupying a circle of about a foot in diameter. The bones belonged to an adult, sex uncertain. In two other spots in the barrow two other bones were found, viz., a fragment of a right *os innominatum*, the acetabular portion of which is so shallow as to suggest that it has been affected by disease and absorption, and a fragment of a femur also of the right side. The burnt bones, "iii d," were in much greater quantity than those found in "Sigwell ii," and had some, though very little, charcoal amongst them: differences which may be accounted for by the place in which they were burnt having been in close proximity to the place where we found them. The place of burning we discovered thus. At a distance of 1ft. 9in. below the burnt bones there was a thick seam of burnt wood 4in. thick, and the floor below the ashes, at a spot a little to the north-east of the centre, was very much reddened, showing that a fire had been lighted and had burnt with much intensity upon it. In these ashes on the floor of the barrow were a few fragments of human bone, "iii e," well burnt, like those above, which we may suppose, therefore, to have escaped the careful out-picking which had removed so large a number of the burnt bones from interminglement with the ashes, and had placed them together, as

described, on the top of a mass of earth, piled up to a height of nearly 2ft. above the site of the pyre. A similar up-piling of earth must have taken place in the bark coffin in "Sigwell ii," as the description shows, and a similar picking out of the bones from among the ashes. That the fire had been lighted on the original surface without paring away the turf was plain enough, from the fact that in paring it immediately below the ashes, at 7ft. 9in. to 8ft. below the centre picket—the stalks of coarse grass and bracken were very plainly visible in section (Pl. 3, enlarged section). But besides this we found also round sections of small stakes about 1in. in diameter, which penetrated 6in. or 7in. down into the natural soil, and some of which tapered towards their lower ends. They had been stuck in to support the pile of wood we may suppose. A chipped flint disc, $2\frac{1}{2}$in., chipped on both sides, was found in the centre of the burnt wood, "Sigwell iii c," which might have been used as a sling-stone with a riband sling. Of the other flints some have black fracture surfaces, others had been weathered before being put into the barrow; two good scrapers were amongst them, one "Sigwell, iii. c," having been found by us 3ft. 5in. south-west of the centre, and 4ft. 7in. below the surface; the other "Sigwell iii f," having been found by the Rev. J. A. Bennett in superintending the filling-in of the excavation. One flint has a saw-edge, as I think purposely produced; another has the appearance (but not, as I think, the reality) of a barbed arrow-head. Some of the flints had been burnt.

The two bones found at a distance from the burnt ones may nevertheless have belonged to the same body as that which furnished the ashes; both are of the right side, the one an *os innominatum*, the other a femur fragment. They may have escaped the perfect burning to which the rest of the skeleton was subjected. Why they were not put together with the perfectly burnt bones I do not know. The charcoal and ashes of the pyre must have undergone a very complete sifting to leave so few bones behind amongst them, and also a very complete shifting of place as regards a considerable part of them, for the layer of charcoal over the natural soil, which had been reddened, was not thicker than that which was over the parts which were not so reddened. The charcoal over these latter parts, therefore, must have been removed on to them. That the burnt bones were collected in a skin, or possibly in some textile fabric, and so placed where we found them, may, in the absence of any relics of bark, or of either of the other substances just mentioned, be shown to be probable by a reference to a paper by the Babu Rajendralala Mitra, in the "Journal of the Asiatic Society of Bengal," 1870, iv., p. 253, where we read that the bones from the pyre "are washed and put in an urn or tied up in a piece of black antelope skin."

That the two large fragments of bone found in this interment may very well have belonged to the same body as that which furnished the ashes, is evident from the following observations of Dr. Hutchinson, of Patna, which are put on record by Dr. Norman Chevers. in his "Medical Jurisprudence," p. 64, 1870:—

"Dr. Hutchinson, of Patna, an active observer of all that can throw light upon our knowledge of medical jurisprudence in India, took an opportunity to ascertain exactly the amount of wood which would be necessary to destroy entirely an adult healthy body, and the time that would be necessary for its entire cremation. The pyre was composed of ten maunds of wood, but an equal amount of fala straw was necessary, as also two bottles of oil. The pile was lighted at 6·30 P.M., and at 3 A.M. next morning the consumption of the body was declared to be complete. When he visited the spot he found in the centre of the ashes the heads of two femora entire, but completely calcined, and a mass of incinerated matter, as large as two fists, said to be the remains of the liver. This 20 maunds, or 1,600 lbs. of wood and straw and two bottles of oil, were required to consume a healthy body, and 8½ hours more required for the operation, which even then was virtually incomplete. Here, however, five times the needful quantity of fuel was consumed."

Observations *on the* Topography *of* Sigwell.

By Major-General A. Lane Fox.

As it was my particular function during these excavations to make the survey and take the measurements, a few words on the topography of the neighbourhood of Sigwell may be desirable.

Leaving Professor Rolleston, whose admirable description we have just heard, to superintend the digging, I set about examining the surroundings. At the distance of a mile in a south-west direction we have Cadbury, a large British camp, which like most earthworks that are distinctly British, occupies with its entrenchments the whole brow of the hill on which it is situated; it is one of those positions which the Rev. F. Warre, in his excellent classification of the British camps of this district,* describes as fortresses pure and simple, having no interior divisions, as distinguished from other works which, having a kind of keep and sometimes one or two fortified interior partitions, he considers to be fortified towns rather than positions of a purely military character. It is on a detached spur from the line of hills which are shown on the right of the accompanying rough sketch, and which run north and south, forming the eastern boundary of the Yeo Valley, and the source of many of its tributary streams. To the west of Cadbury the ground is low for some distance. On the east, the summit of the hills is occupied by table land, the margin of which is defined in the accompanying sketch by Littleton Hill, Pen Hill, Charnwell, Sigwell, and Gurt, and between this range and Cadbury is the long eastward-stretching valley of Whitcomb, with its central stream rising in Sigwell and joining another stream from the summit

* Proceedings of the Somersetshire Archæological and Natural History Society, Vol. v., p. 38.

of Charnwell, below Cadbury Hill, from which point it flows westward by Sutton Montis and ultimately into the Yeo. Paddock Hill is another detached hill, belonging to this range and situated between Cadbury and Gurt.

The position of the twin-barrow first opened and described by Professor Rolleston on the table land is shown on the sketch (Pl. 1), which it must be observed has no pretension to accurate detail, and is simply an enlargement from the Ordnance one-inch map. Past this tumulus an ancient British roadway runs northward, and turning to the west descends the hill by the steep ravine between the round barrow opened afterwards, and Sigwell, and then running along the north east of the Whitcomb Valley below the hill and beneath Charnwell, takes the direction of South Cadbury. My attention was first directed to the little spur of Sigwell, between the two steep ravines which unite at the six wells or springs from which Sigwell derives its name. (*See* Pl. 2.)

This spur, it soon appeared evident, had been converted into a camp by means of a ditch about 60 ft. wide uniting the two ravines, The artificial character of this ditch is shown by its direction forming with the two ravines the base of an equilateral triangle, and therefore being in a position in which it would be impossible that it could have been excavated by water flowing along the ravines from the high ground. The rampart, if it ever had one, has been destroyed, but it is possible the earth from the ditch may have been used to form an interior mound. It would appear that the ditch, as at first drawn, formed too oblique an angle with the northern ravine, and that in order to prevent the position from being taken in reverse by missiles from the high ground on the opposite side at R, the ditch was afterwards thrown back on that side; this, at least, appears to me the best way of accounting for the mound H (Pl. 2), composed of undisturbed soil, which has been left in the ditch on the line of the old escarp, and another smaller ditch cut at the back of it; the structure however is peculiar, and may bear a different interpretation. The ditch throughout its length is shallower than the two ravines which form the north and south defences of the triangular interspace; but as the soil is yielding, it is probable that the ravines may have deepened considerably since the place was used for defence, and the inclosed space has probably, by the widening of the ravines at their summit, been much reduced, whereas the ditch not being liable to denudation by water has retained its original depth.

The section A, B, C, (Pl. 3) running through the tumulus and across the camp, shows that the interior of the camp is commanded at the short bow-shot range of about 120 ft. by the summit of the tumulus. I assume, therefore, that it is unlikely the defenders of the place should have allowed such an erection to be made outside their camp at the time it was occupied; and as we have proved by excavation that the tumulus belongs to the Bronze Age, it is a reasonable conjecture that the camp was abandoned at some time previous to the termination of the Bronze period. This is confirmed by finding an unusual number of flint flakes and chips in the interior of the

camp—I say unusual because a considerable portion of the neighbouring ploughed lane was searched by the whole party without finding such an accumulation of flakes in any other spot; so abundant were they that we should have no hesitation in pronouncing such an accumulation of chips to mark the site of a small flint implement factory wherever it might be found. This evidence of the antiquity of the camp must be taken for what it is worth. In my judgment, and what is of greater value, in the judgment of Professor Rolleston and those other gentlemen by whom we were accompanied, it is sufficient to make it extremely probable that the camp is at least as early as the Bronze Age, assuming it to be a work of defence, which I see no reason to doubt. (*See* the plan, Pl. 2 and the sections D, B, E, A, B, C, Pl. 3).

Another hypothesis may be mentioned, viz., that the ditch instead of being a work of defence is simply the continuation of the ancient roadway which, instead of passing down the ravine ran across the top of the hill, and thus the small trench above mentioned is the way down the eastern ravine; this view, however, is rejected by Professor Rolleston and myself.

We have now to consider the value of this conclusion and its bearing upon the topography of the surrounding neighbourhood. It is seen that this camp at Sigwell commands the six springs beneath it. Charnwell also, on the nearest projecting hillock to the north, had been already recognised as a British camp by the Rev. Mr. Bennett, rector of South Cadbury, to whose knowledge of the antiquities of this district we were indebted on so many occasions. The entrenchment at Charnwell, with its ditch on the outside cutting across the gorge of the hill, is distinctly seen on the east side, the remaining sides being defended by natural declivities which as usual in British camps are rarely strengthened by embankments, the only exception being in this case at the west end, where the slope is more gentle and where a small rampart, now used as a division to a field, has been thrown up so as to enclose the spring before mentioned, which rises on this hill and joins the Sigwell rivulet beneath Cadbury.

Both these small camps, therefore, covered springs. Whether there is a camp on Gurt Hill to the south I am unable to say with certainty; my impression is that there was. There has certainly been a low bank with a ditch on the outside across the gorge or narrowest part of the hill, but the greater part of it has been destroyed by a quarry, and there is no spring on this hill that I am aware of. There are also traces of a small bank on Littleton Hill to the north, but not of sufficient extent to afford trustworthy evidence of a defensive work.

Whether there were two or more of these banks, it appears unlikely that such small and feebly-defended camps could have held their own as the strongholds of independent tribes in the vicinity of so large and powerful a fortress as Cadbury, defended by three ramparts and almost precipitous declivities on all sides; and we might therefore assume on *à priori* grounds that they were outposts

dependent on the larger fortress. But other and more cogent reasons may be urged in favour of this assumption. The occupiers of Cadbury had flocks and herds as proved by animal remains discovered in the interior and described first by Mr. Winwood* and subsequently by Professor Rolleston. These flocks and herds must have had pasture somewhere. To the west, as I have said before, the great valley is low, swampy, and probably at that time an impassable jungle. The high, dry, and well watered Valley of Whitcomb, between the camp and the hills, would be the only place in the neighbourhood where these flocks could be pastured; but with the commanding hills to the east, and the springs arising from them in the hands of an enemy, there could be no security against surprise by hostile neighbours who, approaching unperceived from the table land, might at any moment make raids upon the cattle from the hills above. The sources of water supply and the command of the hills must therefore have been a matter of vital concern to the possessors of Cadbury, and the small camps of Sigwell and Charnwell appear to have been thrown up to command the springs and secure an uninterrupted communication with the plateau beyond. From these considerations it would appear that we have here evidence of a central fortress defended on one side, and that the most approachable, by a chain of detached but dependent outposts, which affording as it does some insight into the social condition and military organisation of the inhabitants of this district at a very remote period, may be regarded as being of some interest to anthropologists. That Cadbury was occupied at a later date than that of which I have been speaking, appears certain from the discovery of horse shoes and other objects of iron within the camp;† but if the evidence afforded by Sigwell camp and the adjoining tumuli is to be relied upon—and I see no reason why it should not be accepted, at least provisionally—the first erection of the fortress and its connection with the neighbouring outposts should date from a period not later than the Bronze Age.

May 28th, 1878.

Major-General A. Lane Fox, F.R.S., *Vice-President, in the Chair.*

The minutes of the previous meeting were read and confirmed.

The following presents were announced and thanks were ordered to be returned to the respective donors for the same.

* Proceedings of the Somersetshire Archæological Society, Vol. xvi., p. 18.
† *Ibid.*

FOR THE LIBRARY.

From the REGISTRAR-GENERAL OF VICTORIA.—Patents and Patentees. Vol. IX, 1877.

From the AUTHOR.—Visitors' Handbook to Weston-super-Mare and its vicinity. By the Rev. W. Jackson, M.A.

From the SOCIETY.—Proceedings of the Physico-economical Society of Kœnigsberg, 1876.

From the ASSOCIATION.—Journal of the East India Association. Vol. XI, No. 2.

From Prof. F. V. HAYDEN.—Bulletin of the United States Geological and Geographical Survey of the Territories. Vol IV, No. 2.

From the AUTHOR.—Suture anomale dell' osso Malare in sei crani Umani. By Dr. Paolo Riccardi.

From the SOCIETY.—Proceedings of the Royal Geographical Society. Vol XXII. No. 3.

From the EDITOR.—Revue Internationale des Sciences. Nos. 20 and 21, 1878.

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From the ASSOCIATION.—Proceedings of the Geologists' Association.

From the ACADEMY.—Atti della R. Accademia dei Lincei. Vol. II, No. 3.

The following paper was read by the Author:—

BUDDHISM *in the* BRITISH PROVINCES *of* LITTLE TIBET.

By COLONEL EDWARD PASKE.

Late Deputy-Commissioner of Kangra, Punjaub.

A STRANGER to this Institute, and without pretence to having made any anthropological inquiry and research, I feel that some explanation, and indeed apology, is required for my presumption in offering to read a paper this evening.

I happened to show to Major-General Lane Fox, a member of your Council, a short paper I had written on Buddhism in Little Tibet, and he begged me to read it at this Institute. After some hesitation I felt it right to comply, for the reason assigned in the following preface.

"The accompanying paper was written with a desire to assist in making known the labours of earnest-minded and self-denying Missionaries, who are devoting their lives to a good cause in the wild mountainous regions of Little Tibet. Much that is described has come under my personal observation, while on official tours in Lahoul and Spitti in the years 1872, 1873, 1874.

"The paper was only intended for circulation in manuscript among a few friends. I have now placed it at the disposal of the London Association in Aid of the Moravian Missions, having been informed that its publication and more general circulation may possibly awaken and foster an interest in the Mission work."

For the present occasion, and with reference to the objects of this Institute, I have added some observations descriptive of the people inhabiting the regions of Little Tibet,—their manners and customs, and I have also brought a few curiosities which illustrate the ritual of Buddhism.

I may mention that between the years 1867 and 1875 I held administrative charge of a tract of mountainous country, called the Kangra District, in the Punjaub, situated on the outer ranges of the Himalaya Mountains, covering an area of about 12,861 square miles, and containing a population of about 752,500 souls. Included in this district are the outlying subdivisions of Lahoul and Spitti, which form a portion of Little Tibet, and will be the subject of my reading this evening.

I usually visited these subdivisions in the autumn of the year, after the breaking up of the rains, and before the passes, which give access to that part of the country, were closed by the winter snows. My visits were of necessity brief. I had to travel upwards of 200 miles from my head-quarters, making the journey on horseback by regular stages, accompanied by a small portion of my office establishment, and with a sort of flying camp, my ordinary work accumulating the while at head-quarters; and there was always the fear that when once in Lahoul or Spitti, late in the season, a return might be delayed by the falling of heavy snow on the passes. Thus, in these hurried official tours my opportunities for observation were of necessity brief.

It may interest you to be told that on starting from Dhurmsalla, the head-quarters of the district, the traveller proceeds for about 40 miles through what is termed the Kangra Valley, an apt description of which is given in the following lines from the pen of the late Mr. George Barnes, formerly Foreign Secretary to the Government of India.

"I know no spot in the Himalayas which for beauty or grandeur can compete with the Kangra Valley, and those overshadowing hills. No scenery presents such sublime and delightful contrasts. Below lies the plain, a picture of rural loveliness and repose. The surface is covered with the richest cultivation, irrigated by streams which descend from perennial snows, and interspersed with homesteads buried in the midst of groves and fruit-trees. Turning from this scene of peaceful beauty, the stern and majestic hills confront us. Their sides are furrowed with precipitous water-courses: forests of oak clothe their flanks, and higher up give place to gloomy and funereal pines. Above all are wastes of snow or pyramidal masses of granite too perpendicular for the snow to rest upon."

Scattered through the Kangra Valley lie the numerous Tea

Plantations where during the last 18 years European settlers have been engaged in the cultivation and manufacture of tea, with most successful results.

Leaving the Kangra Valley, the road lies for about 50 miles through a wild and mountainous country, the territory of an independent chief: when, crossing a mountain pass about 10,000 feet above the sea, it enters Kulu, another subdivision of the Kangra District. Beautiful as is the Kangra Valley, so well described by the late Mr. G. Barnes, it is almost surpassed by the scenery in Kulu.

Winding through the Kulu Valley, along the banks of, and up to the source of the Bias River, for a distance of 40 miles, the road approaches the passes which give entrance to the subdivisions of Lahoul and Spitti.

I can conceive few sights more sublime than the view from the edge of the Rotung Pass that leads into Lahoul. You stand about 13,500 feet above the level of the sea; nearly 4,000 feet below lies the narrow valley of the Chundra River, and rising like a wall on the opposite side are mountain ranges towering in peaks from 18 to 20,000 feet high. No trace of verdure—wastes of snow and glacier, masses of rock and granite, too perpendicular for snow to rest upon.

"On the slopes of the Western Himalayas in North India, about from 31° to 33° N. lat. and from 76° to 78° E. long. lie Lahoul and Spitti, Tibetan Districts under British rule, which with Zanskar, Ladakh, and Rupchu, situated to the north of Lahoul, and under the rule of the Maharajah of Cashmere, form the provinces of Little Tibet. They border in the east on Chinese Tibet, and in the north on the territory of the Amir of Kashgar. Lahoul and Spitti are entered over mountain passes, varying from 13,000 to 16,000 feet above the level of the sea. The inhabited valleys in those regions are about 11,000 feet above the sea, and the heights of their mountain peaks vary from 15,000 to 22,000."

Lahoul may be termed a network of mountains, which intersect it in every direction with numerous glaciers; on the western bank of the Chundra rises a peak 21,415 feet above the sea level, to the south of which stretches a vast glacier 12 miles in length, met by another of even greater dimensions. The main elevation of the Lahoul Valley has been computed at 10,535 feet.

In Spitti the mountains are at a higher elevation than in Lahoul, one peak rising to the height of 23,000 feet, and several upwards of 20,000 feet. The main elevation of Spitti has been computed at 12,986 feet.

The country throughout Lahoul and Spitti is rugged and in-

hospitable in the extreme; for six months snow covers the ground, the cold is severe, and the soil yields only one crop in the year.

Buck-wheat and barley are the principal grains produced in the country; these are sown in May and reaped in September. Of vegetables and fruits, there are scarcely any indigenous to the soil; but the Moravian Missionaries have introduced European fruits and vegetables with marked success. The supply of rain throughout the country being so precarious, irrigation is largely resorted to. Capital breeds of ponies are found in both Lahoul and Spitti, hardy sure-footed animals well suited to the country. The "Yak" and the hybrid between the Yak and the cow are universally used alike for the plough and for carrying loads, and their milk is much appreciated as an article of diet. Accustomed to the most bitter cold, the Yak appears to enjoy itself in the most severe weather, finding its own pasture by scraping up the snow in a clever manner. In the winter the animal is often to be seen with icicles several inches in length hanging to its nose, and a foot or so of ice hanging to the hair which falls from its neck and shoulders. Long hairs hang over the Yak's eyes and prevent their freezing. The Yak's tail is of a fine silky wool, and is termed "Choura;" these are largely sold, and set in silver handles, are used by chiefs throughout India in State ceremonies.

The undeveloped mineral wealth of the country is very great. Mines of lead, copper, iron, antimony and probably of silver, exist in different parts. A company was established and capital embarked for working these mines, but owing to the severe nature of the country and climate, the difficulties of access, and a good deal through bad management, the enterprise fell to the ground. The population of Lahoul and Spitti together does not exceed 10,000 souls.

The Lahoulees, who are far from being a comely race, represent an admixture of Hindu and Tartar blood, while the Hindu type of features is not unfrequent. More generally oblique eyes, flat faces, and large mouths betray the Mongolian origin. The people of Spitti bear on their faces still stronger proof of Chinese or Mongolian descent, and are generally, both men and women, larger and more strongly built than the Lahoulees. In both countries the language is Tibetan, but in Lahoul more frequent intercourse with strangers from Hindustan has led to the introduction of Hindi and Urdu in some parts.

The dress of the men in Lahoul usually consists of loose woollen trousers, grey in colour, with short coat of the same material, and in winter a third woollen blanket, brought round the body and thrown over the shoulder, somewhat after the fashion of a Highlander's plaid; on the head a kind of skull-

cap, with flap to cover the neck and ears; simple straw shoes are usually worn.

In Spitti the costume of the men is somewhat different, being more elaborate and with more prominent and mixed colours. In Spitti also it is the custom to shave the greater part of the head, leaving only a pig-tail which hangs down. A "Chukmuk" or strike-light, and a steel-pipe, specimens of both of which I produce, and also a tobacco pouch, are usually worn in each man's waist-cloth. Men and women alike wear ear-rings and necklaces, usually of turquoise and coral mixed with glass, crystal, and pieces of amber. The specimens of turquoise and amber that you will observe on the table, are some that I purchased in Lahoul: a stone here and a stone there taken by the vender from his own necklace and sold on the spot.

The women in Spitti and in neighbouring provinces wear a very peculiar head-dress, consisting of a broad band of red cloth studded with large turquoise and other stones, and arranged to hang from the brow down the back of the head and neck to the waist, which is called a Pirak. Usually a Pirak forms part of the dowry given to the bride by her parents, and the value of the ornaments varies according to the means and position of the family. The Nono, or chief man in Spitti, when once asked why his grown-up daughter was still unmarried, replied that he had not been able to secure all the ornaments for her Pirak. On one occasion, when resting near a Tartar encampment, I tried to purchase a Pirak from an old Tartar woman, but we could not come to terms about the price. I offered Rs. 100 or £10, while she would take nothing less than Rs. 150, and as the band of the Pirak was very old, greasy, and dirty, I declined the bargain. Subsequently one of the chief men of Lahoul had made for me, at a cost of about £5, the small Pirak I now show you.

The people of Lahoul and Spitti are peaceful and orderly, for the most part engaged in agriculture; they have few handicrafts, and these of the rudest character, except that in Spitti good blacksmith's work is to be obtained. The Lahoulees are great traders, importing from Lahoul and Yarkund, wool, borax, sulphur, and churrus (a species of hemp) with other products of those countries, which they exchange for opium, sugar, cotton goods, and other commodities of India, which they purchase in Kulu. Some of these traders are most enterprising and endure great hardships in their perilous journeys over the highest mountain passes. The month of October, when I usually visited Lahoul, was the season for the return of the traders, and on each day's march I would meet droves of laden ponies and mules, and flocks of sheep and goats, each animal laden with a small pack of borax or churrus. Frequently, too, the hill sides, and the

valleys below, wherever fuel, water, and pasture were obtainable, would be dotted over with Lahouli encampments, the tents, generally speaking, being nothing more than blankets spread over with cross poles, with bales of goods heaped up on the exposed side for protection from the wind. Large and powerful sheep-dogs are to be seen in every encampment; these are excellent watch dogs, not only do they keep strangers from the tents, but they protect the flocks from wild animals. These powerful dogs are not slow to attack a leopard or a bear, and as wild beasts always try and seize them by the throat, each dog is protected by a very broad iron collar, heavily spiked with large nails.

Polyandry prevails to a great extent both in Lahoul and Spitti, and once married the wife is the common property of all the brothers, not one of whom can claim the special paternity of any particular child. Polygamy too exists in some localities when men are well to do. Betrothals take place very early in life; the betrothal and marriage ceremonies being most simple, the marriage tie sits lightly and divorces are readily obtained.

As in all countries where Buddhism is rampant, the eldest son succeeds to the property, and all the younger sons become Lamas or priests. But in Lahoul most of the Lamas marry and cultivate lands, and have very little of the monk about them.

"The religion of Lahoul, Spitti and Ladakh is a modified form of Indian Buddhism, introduced into Ladakh about two thousand years ago. It was spread into China at the beginning of the Christian era, and into Great Tibet about the middle of the seventh century. The main difference between this form of Buddhism and Hinduism is, that the Buddhists rejected the whole of the Brahminical system of gods and goddesses, and adhered closely to the spiritual worship of the Vedas. The priesthood among them was not hereditary, but formed a distinct community, recruited from the regular ranks, and supposed to observe a vow of celibacy and to renounce the pleasures of sense.

"Sukhya Muni, the traditional founder of the Buddhist faith, is usually called Sukhya Thubba, or the mighty Sukhya. The Buddhist Triad, called in Sanscrit Rutna Trayáya, or the Three Gems, is styled Kom-chlok Sun, or the three Supremacies, by the Tibetans, who give the following names to the different members of the Trinity.

"1. Buddha is Sangya Kon-chok, or the Supreme Intelligence.

"2. Dharma is Chhos Kon-chok, or the Supreme Law.

"3. Sangha is Gedun Kon-chok, or the Supreme Congregation.

"In the earlier periods of Buddhism, the worship of the people was confined to the holy triads of Buddha-Dharma and Sangha.

In the present day their worship is equally given to other Buddhas —Padma Pani, Jamsa, and Chanrizak.

"The self existent Adi Buddha by five spontaneous acts of divine wisdom (jugán), and by five exertions of mental reflection (dhyán), created the Puncha Dhyani Buddha, or Five Celestial Buddhas. Each of these Buddhas again by the mere exertion of his inherent jugát and dhyán is said to have created a Buddhisatwa. All the above are celestial beings, the spontaneous emanations from the Divinity, who have never been subject to the pains of transmigration. Inferior to these are the created or mortal beings, divided into six classes, named the six advancers or progressers, because their souls progress by transmigration from one state to a better state, until they finally attain absorption into the divine essence, after which they are no longer subject to transmigration. The six classes are 'Gods,' 'Demi-Gods,' 'Man,' 'Brutes,' 'Goblins,' 'The Damned.' It is one of the most essential dogmas of the doctrine of transmigration, that the disembodied soul is incapable of receiving either reward or punishment. Hence the belief in other grades of mortal beings, both superior and inferior to man. The good man after death is supposed to be raised to the dignity of a demi-god, while the bad man is degraded to be in the state of a brute; a rise or fall in consequence of works done in a former state. This transmigration is the punishment of sin, and only by a total expiation thereof can the soul cease to be re-born. The process of transmigration is gradual, going on through an infinite succession of time, inasmuch as the soul must pass through all the lower stages, and thus gradually expiate its sins, before it can reach the more exalted state, and attain its final resting-place. What each new phase of life will be, is determined by the state in which a man last died. The moral law of Buddha prescribes a life high and pure, a constant straining after perfection, in order to secure that blissful state of rest which is the only emancipation from a state of eternal transmigration.

"Formerly the Great Abbots or High Priests were elected by the Priests. Now, however, there is a system of supposed perpetual incarnation. Every successor of the Grand Lama is regarded as an incarnation of the great deity, and as the throne in course of time becomes vacant, on each occasion it is the object of the priesthood to find an infant supposed to possess distinguishing divine marks, and to consecrate him as the Great Lama. The present two great spiritual successions are the Dalai Lama, or High Priest of Lhassa, and the Panchen Rimpoches of Teshu Lampi. The Dalai Lama is called Gyalba Rimpoche, 'the Gem of Majesty,' and the Tashi Lama, 'the Gem of Learning.' A priest or monk is styled 'Lama,' and a nun 'Ani.' High as is the standard of morality prescribed for every follower of Buddha, that of the Lamas or Priests is more rigid still. They may have but one meal a day, wear a dress of rags sewn together by themselves, and are bound by a vow of celibacy and poverty. During part of the year they must live in the open air, spreading their

carpet under the shadow of a tree, and there sitting immovably in contemplation, or meditating on their own sins, not allowing themselves to lie down even in sleep. In practice, however, the standard of morality is sadly low; some of the Lamas marry, too many lead grossly immoral lives, and most of them take to their calling mainly as a means of living easily at the expense of the people. Among the Buddhists there are different sects, the two chief of which are the Red Sect and the Yellow Sect, distinguished by the colour of their dress. A remarkable feature in Buddhism is the resemblance of some portion of their ritual to that of the Roman Catholics. The first Roman Catholic Missionaries who penetrated into Tibet were amazed at finding rites and ceremonies similar to some of those of their own Church—chanted litanies, the use of incense, processions carrying banners, confession, adoration of relics, ringing of a small bell during service, priestly robes and shaven crowns, monastic celibacy, ascetic separation from the world, orders of monks and nuns, working out life-long penances, ritualistic altars with images, the use of rosaries, long strings of black beads told while muttering.

"During his last journey in Lahoul, the writer secured specimens of the chief ritualistic instruments of the Buddhists, viz.—The Bell, the Sceptre or Thunderbolt, and the Prayer Cylinder, and they deserve some description.

"1. The Bell is called Drilbu, and is used in the performance of daily services. In paintings of the great Lama it is usually represented in the hand, or on the throne by the side of the great priest. The bell purchased by the writer was obtained from a monastery in Ladakh, was originally brought from Lhassa, and is believed to be about 300 years old. The bell is of well-sounding metal, on the upper part are syllables said to represent the notes of the bell, and inside are the monosyllabic interjections 'Aum! Ah! Han!' The handle has a representation of the sceptre.

"2. The Dorgé, sceptre or thunderbolt, is a holy instrument, said to have fallen from heaven, and to have alighted in a monastery at Lhassa, where the original is still retained. It is called in Tibetan 'sera-pun-dze;' an annual festival has been established in its honour, and is one of the principal religious fêtes. An imitation of the Sceptre is carried about by the Lamas or Priests, and is used in subduing evil spirits. These imitations are of copper or other metal, about four inches in length.

"3. The Prayer Cylinder, called 'Mani Chhos Kor,' is a metal cylinder, with the axis prolonged below to form a handle. The cylinder is filled with rolls of printed prayers and charms which revolve as the instrument turns, each revolution of a prayer being equivalent to its recitation. The formula usually inscribed on the rolls is 'Aum mani padmi hun,' an invocation 'To the Jewel on the Lotus,' in reference to the Lotus throne, that is to say the pattern symbolical of the Lotus or water lily, with which Buddha's throne is always adorned; 'Aum' or 'Om' is equivalent to the Hebrew

'Jah,' the holiest and most glorious title of the Almighty; 'Mani,' the jewel of Buddha's titles; padmi is the Lotus; Hun, or Hoong, is equivalent to Amen. The prayer-cylinders vary in size from little hand-mills, as large as a policeman's rattle, to huge things ten and twelve feet in diameter. In the monasteries there are rows of cylinders set up along the walls, and so arranged that the passer-by can set them all revolving at once by drawing his hand along them as he passes. The Buddhists trace back the prayer-cylinder for at least 1400 years, and believe it to have originated from the notion that it is an act of merit, and a cure of sin, to be ever reciting portions of the sacred writings of Buddha; but as so many could not read, it was deemed sufficient to turn over the rolled manuscript. It is iniquitous to turn the prayer-cylinder the wrong way.

"A peculiar custom of the Buddhists is the erection of stone-dykes or walls, several feet high, at the entrance of towns and villages and in main lines of road. Upon these dykes the people heap slabs of slate or stone, on which are inscribed certain 'Muntras' or prayers, the usual one being the invocation. 'Aum mani padmi hun.' These slabs are votive offerings from all classes for the attainment of some particular objects. Does a childless man want a son, a merchant about to travel hope for a safe return, or a husbandman look for a good harvest, or a shepherd for the safety of his flock in the winter, each goes to the Lama or priest, purchases a slab on which the priest carves the prayer, and it is then deposited on the village mani or dyke. In depositing a slab, it is necessary always to move to the right; to go round the left of the dyke is almost as unlucky as to turn the cylinder the wrong way. These manis or dykes, on which numberless slabs have been heaped, always attract the eye on approaching a village. In Ladakh there are two manis measuring upwards of 800 paces in length.

"It is customary also among the Buddhists for the Lama to keep small wooden printing-blocks, engraved with some prayer, from which the prayers are printed on little flags or pieces of coarse cloth. These flags are sold by the priests to travellers and others going on journeys and expeditions, and they are deposited on cairns or on projecting rocks on high mountain passes,—the higher the mountain the nearer to heaven, and the more desirable the position. On one occasion, when crossing a mountain pass in Lahoul about 15,000 feet above the sea, the writer observed a rag fastened on a stick stuck on the top of a cairn on the highest accessible point on the pass; he secured it with much difficulty, and found it was a prayer-flag.

"In noticing the Tibetan printing-block, it is desirable to mention that printing has long been known and practised in Tibet, but only by engraved stereotype wooden blocks, and not by movable type. New works are rarely undertaken, but the printing of their standard religious treatise is still carried on by the Tibetans with the same old blocks that were in use upwards of 100 years ago. The great mass of printing is chiefly confined to the production of the innu-

merable quantity of prayers and mystical formulas that are required by the people.

"The Tibetans reckon time by cycles of twelve years, each cycle being named after a particular animal. Long rolls of paper are made into calendars, with woodcuts representing the animals after which each cycle is named. The rolls are placed in brass cylindrical boxes, and are worn as amulets by traders and travellers.

"The Lamas or priests are so much venerated by the Buddhists that on the death of any noted Lama his body is burnt, and the ashes mixed with clay, are worked up into small medallion figures, and preserved with much care. These figures are called 'Tsha' or image, and in the temple of every house there is a small room or cupboard, called the Tshakhanga or image room, set apart for the reception of these medallions. In one temple a traveller saw about one hundred cubic feet of space filled with them.

"The Monastic system is of very ancient date among the Buddhists in Tibet. The monastery is termed 'Gonpa,' or solitary place, because monasteries were originally built according to the directions of the founders of the creed, far from the bustle and disturbing influences of cities; convents are only separate monasteries, walled off from the rest of the buildings. While these monastic institutions are supposed to afford a refuge from the sinfulness of the world, with such retirement as might help to a life of celestial meditation, there is too much reason to suppose that they are hot-beds of vice of every description.

"The monastery at Kyelang in Lahoul has quite the character of a 'solitary place;' it stands on the projecting spur of the mountain side, distant from all other habitations, at an elevation of upwards of 12,000 feet above the level of the sea, and is approached by a steep and difficult path. The deep ravines and glacial beds that are observed in the neighbourhood add to the wild grandeur of the scenery. At some seasons the approach is even dangerous, and in the spring of 1874 a monk and a nun were buried in an avalanche, while wending their way up the path. The building itself is of considerable extent with a flat roof ornamented with flags; its outer walls are plastered with mud and whitewashed, having strong projecting verandahs. In the interior are galleries, along the walls of which are arranged numerous praying wheels, a lofty apartment used as a kitchen, a library full of collections of holy books wrapped up in silk, and numerous banners, masks, drums, trumpets, cymbals, bells, mitres, staves ornamented by the trident, and many other things used on festive occasions. Near the library is the great hall in which are the statues of Buddha and his disciples; some made of wood and clay are more than life-size, and other smaller ones are of metal, all decked out in robes of different colours. Numbers of brass and silver oil-lamps are placed before the images, and near receptacles for offerings of all kinds. The walls of the entrance gallery and of the great hall are ornamented with decorative paintings representing subjects from Buddhist mythology, some of them very well coloured, and showing considerable artistic skill.

The roof of the hall is supported by massive beams garnished with belts, swords, yaks' tails, huge and terrible masks, and all sorts of odds and ends. On one side of the apartment is a huge praying-wheel about ten feet in height and five feet in diameter, and on each revolution of the same a bell is struck. A dim subdued light prevails throughout this chamber, which exaggerates the ghastly hideousness of the huge figures, and gives the appearance of a chamber of horrors. Outside the main building are rows of cells occupied by the monks and nuns."

At this monastery I met a Lama who had travelled in China, and had then just returned from Llassa. This priest was a painter, and I found him engaged on a large picture, representing the triumph of Buddhism, for the gallery of the monastery. On receiving a suitable present he executed for me the small copy of the picture which I now show you. The principal figure in the picture is "Padmer Sambhana," also called by various other names, an historical personage chiefly instrumental in establishing a modified form of Buddhism in Bhutur, Sikkim, Lahoul, and Ladakh. He is seated on a Lotus which grows out of a lake with its leaves turned upwards; gold-fish swim in the lake and water-fowls are above; deer, antelope, and a unicorn are on pasture grounds around the lake. He carries a trident with three heads as a sign of his perfection, and representing the Buddhist Triad; in his hand he holds the vial of life, and the sun and moon on his mitre mean that he shines with heavenly brightness. The figure above his head is the personification of eternal life. In the left corner below is represented the same Padmer Sambhana in his ferocious aspect, the figure on the right being the chief of the feminine demons of the air, carrying the trident. Both are punishers of those who try to destroy the religion of Buddha; the figure under the foot of the one on the right is a mortal undergoing punishment: the beads worn as a necklace or rosary by the figure on the left are of those who have been punished for their sins. In the corners above are the pictures of two holy Lamas, that on the left, the first great Lama of Bhatua, that on the right representing the grand Lama of Tunskai, who died about 24 years ago. The Hungarian traveller Osomo de Koros studied the Tibetan language in his monastery, preparing afterwards a very useful dictionary of that language.

"The monastery at Kee in Spiti is larger than that at Kyelang, with more extensive chapels, store-houses and dormitories. It has the appearance of a hill-fort crowning an eminence.

"In the different monasteries large and varied assortments of costumes are kept for use in the spirit-dances and other religious performances. In the richer monasteries in Tibet Proper there are extensive wardrobes of great value, and the monks in their per-

formances change their costumes very frequently and with great rapidity."

On the occasion of my last visit to Kyelang, the monks gave me a performance of their spirit-dance on a plot of level ground outside the monastery. The Abbot in full canonicals, with a scroll of parchment, supposed to be covered with sacred music, attended by musicians with large trumpets, cymbals, and other instruments, took his position on the ground, and when the musicians were playing their loudest, suddenly from a side door of the monastery there rushed out 30 or 40 monks, attired in the most grotesque and startling costumes, their heads covered with large and well-executed masks, representing the heads of wild animals, serpents, and demons; these all danced in a most wild and excited manner, making hideous noises, and every now and then rushing into the monastery to don costumes still more grotesque. These figures are supposed to represent the demons of the air, who torment the souls of the wicked undergoing the process of transmigration. This entertainment, held on a wild lonely spot, on the mountain side, upwards of 12,000 feet above the sea, the light of the torches exaggerating the hideousness of the figures, formed one of the most startling spectacles I have ever witnessed.

The spirit dances cause great terror among the ignorant and superstitious people of the country, and form a means by which the Lamas exercise their hold upon their minds.

"The present observations on Buddhism, its ritual and customs in Northern India, can very appropriately be closed with a brief notice of the history and operations of the Moravian missionaries, who are doing good work among the Buddhist tribes in the Tibetan districts of Northern India.

"In 1853 two of the Moravian brethren were commissioned to proceed through Western Tibet to Mongolia, but failed to make their way through Russia and the Kirghese steppe, having been refused the needful passports by the Russian Government. They then took the route through India and journeyed through Lahoul and Ladakh to the border of Chinese Tibet, where their further progress was stopped by the authorities. Returning for a time to British India, they made another advance to Ladakh, but were prevented settling there by the ruler of the country, the Maharajah of Cashmere. Finally, the missionaries decided to settle in the British Tibetan province of Lahoul, conterminous with Ladakh, and they selected as their place of residence the village of Kyelang, at an elevation of between 10,000 and 11,000 feet above the sea. At once they entered into intercourse with the people, acquired a knowledge of their language, and engaged in itinerating through the province.

"In 1857 the two brethren, Heyde and Pagell, were joined by a

third missionary, Brother Jaeschke, who rendered good service in translating the Scriptures into Tibetan. Two years later they established a lithographic printing-press on the Mission premises, from which they have issued translations of the Holy Scriptures and of useful religious and educational works. Books and tracts from this press have been very freely circulated in all the adjacent provinces where the Tibetan language is used, and have proved the means of doing much good.

"Some idea can be formed of the remoteness and isolation of the position occupied by these missionaries, when it is mentioned that the Tibetan village of Kyelang is situated nearly forty miles in the interior of Lahoul, the most remote province of the North-east frontier of British India, and bordering on the provinces of Zanskar, Ladakh and Rupchu. To enter Lahoul it is necessary to cross two or three mountain passes, the last and highest being the Rotang Pass, about 15,000 feet above the sea—a pass closed by the winter snows from November till May, so that for more than five months in the year the missionaries have no communication whatever with the outer world. Owing to the severity of the climate, and the heavy falls of snow in Lahoul, they are sometimes shut up in their houses for two and three weeks together. This isolation is much felt, especially during the severe winter weather, and two or three graves in the little grave-yard below the Mission garden tell that some members of the Mission family have ended their days in that distant and remote valley.

"When on an official tour in Lahoul in the autumn of 1874, the writer of these observations spent some days at the Mission Station of Kyelang, where he was most hospitably entertained by the brethren Heyde and Redslob and their wives, and where every opportunity was afforded him of examining the Mission work. While he saw many gratifying proofs of the good that is being done, he had abundant evidence of the honest labours, earnest zeal and great worth of the missionaries themselves. The Station is a most interesting little settlement. The premises include a large well-built substantial house in which, besides the accommodation for the missionaries and their families, there is a large room set apart for use as a chapel, and a guest-room for travellers and visitors, who are always welcomed. There are out-buildings appropriated for the schools, the lithographic press work, for dispensing medicines, for stores and other purposes, and around these buildings are well-kept gardens and orchards. Through the instrumentality of the authorities the missionaries have lately secured a tract of waste land, about 200 acres in extent, on the mountain side several hundred feet above the station, where they are establishing a farm, and have already brought a considerable extent of land under cultivation. But here they have many difficulties to contend against; their lands are at a level of 12,000 feet above the sea, and for irrigation purposes they have had to carry a watercourse for upwards of two miles from a distant glacier. The farming operations, as they are extended, will give industrial occupation to the

natives around, and the produce will form a valuable addition to the present scant grain and grass supply of the valley, and will in time facilitate the furnishing of supplies for traders and travellers.

"A second Moravian Mission Station in charge of Brother Pagell was established some years ago in the Tibetan village of Poo, in Upper Kunawur, close to the border of the Chinese Tibetan province of Tsotso, and distant twelve days' journey from Kyelang. This station the writer was not able to visit, but similar good work is being done here, as at Kyelang. An interesting account of the Poo Mission is to be found in a work entitled "The Abode of Snow," by A. Wilson, recently published in *Blackwood's Edinburgh Magazine*.

"The Moravian missionaries contemplate an advance farther north, and hope to establish a station at Leh, the capital of Ladakh, so soon as the objections of the Maharajah of Cashmere can be overcome, and his permission obtained for the commencement of a Christian Mission in that part of his territories. For their missionary purposes no better position could be occupied. Leh is a considerable town, with a large Buddhist monastery in its immediate neighbourhood; it is the centre or meeting point of four lines of traffic, and is on the high road between Cashmere and Lhassa, the great seat of Buddhism in Tibet. Even in their comparatively remote station at Kyelang the missionaries have from time to time collected valuable information regarding the affairs of countries of central Asia, including Ladakh, Kashghar, Mongolia, Chinese Tibet, and Tibet Proper. Advanced to Leh, they would be in a position to add greatly to their stores of information and knowledge of those countries.

"The lofty spirit of self-abnegation with which the Moravian missionaries have laboured for so many years in their remote settlements on the Northern frontiers of British India, can best be understood and appreciated by those who have visited their station. Far removed from civilized life, themselves simple, frugal, and self-denying, they spend their days in labouring hard for the spiritual and moral good of the simple Tartar people around them. Much they have endured with the most exemplary patience, and much they have overcome. Nor is the Mission work of the Moravians in Northern India to be judged only by the number of the converts; their labours are varied and extensive; they have conducted considerable educational operations; their linguistic work has been valuable; they have scattered Christian publications all over the Tibetan speaking countries; in their printing-presses and agricultural operations they afford industrial occupation to a considerable number of the natives of the valley; with the limited means at their disposal they do all in their power to ameliorate the condition of the sick and the poor; and by their active energy and general high standard of life afford the best example to all around them."

Discussion.

Lieut.-Col. Godwin Austen remarked: The paper we have heard this evening contains much that is of great interest to myself, from having spent three summers in Ladakh and Zaskar to the North, and I can testify to the magnificence of the scenery with the grand glaciers that run down from the higher parts of the ranges, separating the above districts from Kulu, &c.

I found also that the women of Ladakh have a very great objection to parting with the head ornament called "*kúkúl*" in Ladakh. Nor is this unnatural; the stones sewn upon the strips of red cloth are difficult to collect and are heirlooms handed down from mother to daughters, as the gift of friends; the intrinsic value may not be much in our eyes, but even our own womenkind would strongly object to sell ornaments off their persons, and the Ladakhi women resent such offers in the same way.

Placing flags or little pieces of rag on cairns upon the mountain passes is to be seen throughout the Himalayas of Ladakh to Bhutan, they are not always printed as in the example shown this evening, but red, blue or black, and white pieces are sometimes seen significant of the Trinity: 1, Gamiang; 2, Chokdor; and 3, Chandrazik; emanations from Sakhya Thuba; this custom is I think a remnant of a very ancient primeval belief, as it is to be seen in the Naga Hills (connected with gods of streams, hills, &c.)

An excellent account, and the best I know, of these people and of their religion and customs, is to be found in General Cunningham's "Ladakh and Surrounding Countries." Hodgson, who was a long time in Nipal, has written much on same subject in the "Journal of the Asiatic Society of Bengal."

I must differ with the author of the paper as to the exceeding bad characters of the Bhuddist Priests,* and with all those who are so ready to make out that they are so immoral. I saw much of them, knew many intimately, often put up in the monasteries, and had good and better opportunities than most men of judging, and I really do not consider them very different from the same class in many European countries; there is the same proportion of bad, but a great number of steady, good, hard-working men engaged in their religious duties and, a great deal of their time, in the education of the youth of the country.† Many are well read, clever men (educated in Llassa), clever draftsmen, painting on cloth and decorating the walls of the religious buildings, and I have had them come to me to learn perspective.

Mr. Hyde Clarke said that while Buddhism was, as stated by

* "Hot beds of vice" was the term used with regard to the monasteries,—I think a missionary point of view.

† The number who can read and write are in excess of what might have been found in many parts of England a few years ago, and none of them are so brutalised as specimens in this country and this city.

the author, a reform of the older Indian mythology, yet several of the practices described belonged to the infancy of prehistoric mythology, whilst others illustrated the local modifications to which Buddhism in common with all religions was subject by the influences of the various regions in which it was adopted. Col. Paske had been engaged in the administration of some of the most interesting provinces on the frontiers of India, and none the less interesting because they belonged to those he called Hill regions, in which new English communities were being slowly and surely built up.

Mr. HOLT would be glad if Col. Paske would tell the meeting whether a Buddhist faced in any particular direction while turning the prayer drum, and if the revolutions round the circles were not always made from east to west. He would also like to know if the Buddhists had not, like ourselves, four festivals corresponding with the winter and summer solstices and the spring and autumn equinoxes. He asked this because he had always been accustomed to associate Buddhists with solar worship, and what Col. Paske said tended much to confirm that impression.

The Rev. WYATT EDGELL observed that if primogeniture was general and all the young children became Lamas, the number of these must be very great; that such is the case however appears from the account of two travellers whose camel drivers were Lamas.

MR. HYDE CLARKE exhibited a carved stone object, which was stated to have been received from Central America.

The following paper was read by the Director.

NOTES *on the* PIOJES *of the* PUTUMAYO. By ALFRED SIMSON, ESQ.

THE chief tribe of Indians inhabiting the borders of the Upper Putumayo seems to have no special appellation, but a portion of it—that least known—whose component members dwell principally on the banks of the branch river Cocaya goes by the name of *Macaguajes*, and is claimed as part of their own people by the others whose customs and mode of life have become somewhat modified by frequent contact with civilization.

A tribe of Indians occupying the middle and lower Aguarico

and a considerable stretch of the left bank of the Napo, speak the same language, and have several traits in common with these Upper Putumayo Indians, from whom, however, they are entirely separated by tribes speaking various languages and holding distinct customs.

The Aguarico and Napo hordes referred to are known as the Santa Maria Indians, or Piojés, from the word in their language *piojé*. The latter denomination appears preferable as at once identifying unmistakably the whole tribe, whilst the former merely designates a single limited locality on the Napo, occupied by one of their hordes. I should propose hence to call all the Upper Putumayo Indians who speak the Piojé language, *Macaguajes* or *Piojés of the Putumayo*.

As my personal observation of and acquaintance with the Piojés of the Putumayo extended only to those living on the banks of the main stream, during long journeys with a number of them selected from different villages, and visits and sojourns in most of these, I shall treat merely of this portion of the tribe. Of the Macaguájes dwelling on the Cocaya my slight knowledge consists in having casually met some of them in their canoes on one or two occasions, when I noted that they spoke the same language as their more civilised brethren, and these informed me that they considered them as part of their own people.

The dwelling-places of the quasi-civilised Piojés are, following the downward course of the river, San José, Cuembí, Yasotoaró, Picudos, Montepa, and Consacuntí, where they receive periodical visits from the cura who baptises the children and marries the betrothed, or rather confirms by the blessing of the Church the matrimonial relations often already entered upon during his absence.

The Christianity of the tribe is not of the most enlightened, for religious instruction and teaching of the children is quite wanting. In past years in this respect more advancement than at present had been made under the Jesuits as the names of various spots here as in other higher Amazonian regions, now covered with profuse vegetation and almost unrecognisable from the surrounding forest, testify, such as Miécuntí, Tapacuntí, and La Concepcion, in the last of which traces of a brick Mission Church may still be found under the entangled growths.

The Piojés, like most of the Christianised Indians on the eastern slopes of the equatorial Andes, understand little or nothing of the religion they have adopted, or which in more truth has been forced upon them, and their habits, customs, and gross superstitions form strange features in a people who go

by the name of and call themselves Christians. The only assumptions they really have made of rites and habits common to Christianised peoples are baptism, marriage, drunkenness, smoking, and occasionally better clothing than is natural to them. All these rites, habits, and vices they submit to with a good grace, excepting marriage, the necessity of which is generally found very irksome and an interference with their liberty which they would fain be without. Those individuals, however, who have undergone the three main qualifications—baptism, marriage and clothing—are conscious of a sort of wholesome pride in their superiority, for they feel that they are more nearly approached to the civilised "blanco." Upon one of their most intelligent individuals, a man named Cimon, introducing according to his fashion an Indian of the Oregon tribe, who had lived with them for many years, to me, and evidently thinking that I might depreciate or despise a member of a savage heathen tribe, he at once informed me that his friend was not an *Auca*, but a Christian and "gentleman like ourselves," meaning himself and me. ("Ese hombre Auca no tiene, caballero tiene como nosotros.") The term Auca, as elsewhere explained, signifies heathen or barbarian, and is applied by all the Christianised Indians of the eastern Ecuatorial Andes to their wilder uncatechised brethren, and of these all who have come into contact with whites or Spanish-speaking Indians deprecate the designation for themselves.

Most of the tribes I have come across, as for instance the Jívaros of the Pintuc and the Piojés of the Aguarico, who know nothing of Christianity, but who have heard of baptism, are most anxious to have their children baptised and call upon one to do it for them; the former also wanted me to perform the marriage ceremony for them. Whilst recording such evident desire to adopt Christian rites, it is regretful that one should have to entertain the fear and even the firm conviction that these wholesome desires do not proceed from any religious feeling awakened in them but merely from the vain anxiety to imitate such customs of the whites as to them smack of high respectability. It is in no cynical spirit that I make this statement, and indeed their inclinations in this respect might be of great value in the commencement of mission labour, only it would be deceiving oneself to imagine that any stir of conscience had taken place within them. Amongst none of these Ecuatorial Indians, even the best taught, have I seen that by religious instruction any of their own superstitions had been effaced, and it is only by steady education of the young that in following generations positive moral advancement can by degrees be hoped for.

That the Putumayo Piojés are monogamous now must be scored in their favour as a point of advancement, for, though I quote no evidence or hearsay to the effect, it can hardly be doubted that, probably not long ago, they were polygamous in common with all the other neighbouring tribes whose customs have not been modified by contact with white men.

As regards drunkenness they certainly do not look upon it as a vice; they experience no shame when upbraided with it; and unlike our casual drunkards, so prone to accuse others of being under the influence of liquor and denying that they themselves are, these Indians when tipsy at once admit their state and seem highly pleased to find themselves in such a creditable condition. When the intoxication is in moderation the most taciturn become loquacious, and when it is excessive, broils and even serious fights are almost sure to result, especially if any individuals belonging to different villages be present together.

It is particularly sad that this vice should have become inculcated by the pioneers of civilization into this tribe, for they themselves appear to manufacture no fermented liquor, their only drinks being ripe plantain boiled and mashed in water, and "yoco." I have not seen either of these beverages left to ferment. "Ayahnasca" the direful excitant of the Napo Piojés, and the wide-spread fermented cassava, "Chicha," are never to be seen with them. "Yoco" their favourite beverage, is a liana, the bark of which in its green state is scraped off, kneaded and mashed in water and then thrown out. The remaining liquor assumes a yellowish brown, not unlike a simple dose of ipecacuanha in colour, general appearance, and even, with modification, at the first moment in taste. Although the first taste is nauseating and bitter, the after-taste remaining on the palate is refreshing and not disagreeable. "Yoco" is imbibed at all hours; in the early morning much diluted and in a larger quantity as an emetic aided by titillation of the throat with a feather, and at other times in stronger but smaller doses as a refreshment and sustenance.

They are also very fond of tobacco macerated with water to the consistency of a thin paste. This is kept in a bottle and the feather or little stick that always stands in it is put into the mouth and then drawn out through the closed lips to remove the adhering relish.

A few words must be said about the last before-mentioned adaptation of these Piojés to civilised habits, namely clothing, and we must, when considering dress from an Indian's point of view, always keep in mind that to him it is more adornment than a veil of modesty and decency. In the case of some wild

tribes, as the Oregones, Cotos, Tutapishces and the Aguarico Piojé women, clothing is entirely, or virtually within a degree thereof, dispensed with. It must not be thought, however, that I desire to imply that the peoples enumerated are devoid of modesty. I myself firmly believe that true modesty and virtue may be compatible with nudity; but that general question is foreign to this paper, and I merely wish in this case to state the fact that these and most Indians adopting more complete clothing than is their wont is certainly, at least at first, not brought about by anything that can be assigned to feelings of modesty or shame.

Those amongst the Putumayo Piojés who have travelled recently, either upwards to the mountains, or more especially downwards to the Solimoens, are generally furnished with trousers and jacket of common cloth, but their own dress is far more becoming. One who had been with me during the greater part of my upward journey on the river, I left at his native village, Consacuntí, in trousers and jacket, but on my return he had adopted his own costume, and for some time after he had saluted me, I did not recognise in the fine figure before me one of the most active, energetic, untiring, and merry of my band. Before he had a very common-place appearance, but now he looked like the finest type of an Indian that romance could paint. His splendidly formed figure was clad in the peculiar Indian poncho, a long piece of cloth the breadth of the shoulders with a slit in its centre for the head, in front and behind hanging nearly down to the knees. The sides are sewn together only on both hips so that the arms have free play, and the legs are laterally visible from the upper part of the thigh downwards. This was the only garment, and the rest was all ornamentation. On his head was a circlet of dazzling metallic blue feathers with three long red caudal plumes of the macaw standing erect; round his arms and wrists tight-fitting bracelets of fresh green leaves; a line of white monkey's teeth encircled his neck and across one shoulder, around his body hung a long double string of black seeds. The greatest admiration this picture attracted though was to the broad shoulders, faultlessly shaped limbs, and the lithe but gracefully erect figure.

A curious feature in the Piojés is the absence of eyebrows and eyelashes, which are all religiously pulled out. The septum of the nose is usually perforated, no doubt originally for the insertion of some ornament, but now they seem rather ashamed of this and wear nothing in it.

The Piojé villages are, like I have had occasion to describe those of other Indians elsewhere, very far from being the settled

habitations the civilised might be inclined to imagine. In many cases the names of the villages are mere localities with a few miserable sheds scattered here and there at considerable distances from one another, as for instance is Montepa. This settlement was formerly more compact, but since a couple of years its inhabitants abandoned their houses and have been sojourning in temporary shanties disseminated in the neighbourhood of their former dwellings. Inroads of diseases, ants, or floods, are frequently the cause of the changes and shifts of the home from one place to another, and the family removals, although not such as are announced in large letters in our metropolis, are effected in the lonely Putumayo woods with all promptitude and ease. An Indian thinks nothing of leaving his house with goods, chattels, wife and children at a moment's notice to emigrate and establish himself elsewhere.

Their sense of hearing is wonderfully acute, as likewise their sight and knowledge of direction. The latter they never seem to lose, and after passing the most complicated turnings of the river I have at night often asked them in which direction their home lay when we were hundreds of miles distant from it, and they almost always, without hesitation or seeming to reflect, pointed in the right direction, which I verified by a compass. Whilst in Tonantins, on the stream of the same name, nearly a mile from the main river Solimoens, some Piojés who were with us by ear used to announce when a steamer was about to arrive fully an hour before she came in sight, and half-an-hour or more before we or any of the villagers could possibly detect a sound.

The Piojé language is not agreeable to the ear, like Quichua, Oregon or Tupi, nor easy to catch and repeat. Its sounds are rather harsh, and the vowels generally emitted with a short abrupt guttural expiration; the final one of a word especially is frequently, as it were, cut off suddenly on its way from the throat before it has made its exit through the lips, and without any modification of its emphasis by a gradual decrease of the breath supplied to sound it.

The language is evidently of very difficult acquisition, as amongst all the strangers I have met who have, during many years, associated with these Indians, I have not found one who could understand and much less speak it. Even a Negress who had lived many years at Yasotoaró, where she had picked up the Brazilian "lengua geral" and some Quichua from mere casual comers, could not understand Piojé. Their numerals, which are subject to some variation in different villages, go up to ten, but really are composite from six to nine, as may be seen by their designations:—

1. Moño.	6. Tequenatequí.
2. Tsamuncuá.	7. Tequenatsamuncuá.
3. Tsamunhuentecuá.	8. Tequenatsamunhuentecuá.
4. Tajesecá.	9. Tequenatajesecá.
5. Teserapuí.	10. Tsëäïnyá.

NOTE: (These numbers and all Indian words and names in this paper are to be pronounced as Spanish).

Although the numerals seem so complicated many other words I was able to collect and note are of the simplest construction as for instance:—

Wild turkey	ují.
peccari	sénsé.
turtle	cóhu.
fowl	cúrá.
tiger	ijái.
fire	tóá.
what is the matter	quimamí.
farewell	sayé.
beads	yíyó.
axe	súpó.
water	ócó.
wind	túrú.
sun	ensé.
moon	ñáüé.
it is going to rain	ócó rájé.

Their facility for pronouncing and learning other languages is marvellous. I found they could repeat English words after me with an almost perfect accentuation—a test so few foreigners can creditably perform—and they seem to pick up other Indian languages superficially with a most enviable rapidity. After a month in Brazil any one of them understands Portuguese and the "lengua geral," and speaks them fairly. One I knew who could speak seven languages, namely, Spanish, Portuguese, Piojé, Tupi, Quichua, Oregon, and Mouroi, and another one the same number, only in place of the last he had learned San Miguel. It must not be thought that the Indian tongues named are mere dialects; they are all completely and notably distinct. The Spanish of the Piojés is very amusing, and elsewhere I have called it Pigeon-Spanish on account of its peculiar similarity in construction to Pigeon-English. The gerund is used with remarkable frequency, and is in fact almost the only verbal form known to the speakers. The use of the gerund, the pronoun of the second person being always used in the genitive case instead of the nominative, the needless insertion

of "tiene" (has or has got) into every sentence, and the employment of the demonstrative pronoun "that" in place of "this" invariably with the masculine termination, are the main characteristics of this curious language. They are very strict in the observance of the rule that two negatives make an affirmative, and if asked, "Is that not a canoe?" would reply, "No," as a negation to the negative question, but as an affirmation to the existence of the canoe. Again to the question, "That is a canoe, is it not?" the reply "Yes" would mean that it was not one; a confirmation of the negative.

The diseases the Piojés are most subject to are catarrh, small-pox, and a skin disease called by the Spanish South Americans, "Carate." The two first make fearful havoc amongst them at times, and are the greatest and deadliest enemies brought to them by the white man. That small-pox should depopulate districts of human beings living under the conditions that Indians do does not appear extraordinary, but that this should be equally the case with catarrh is likely to convey some astonishment to the mind of the European, who is only too apt to ridicule any gravity being attached to a cold. Like the Piojés of the Napo, whose first salutation to a stranger is "*Huairahué, Huairahué!*" whilst indicating the nose, but in a milder degree these Piojés are much alarmed when anyone appears amongst them with evidences of a cold in the head, for they seem to take the contagion with great facility, and it soon assumes a most virulent form of influenza and high fever which too often results fatally. On my descent of the river the Consacuntí Indians accused me of bringing catarrh to them with my party when passing their place on the upward journey. I denied having done so as none of us were suffering from cold. Two months afterwards I heard from a friend who had visited the same village that nearly all its inhabitants had died from the effects of the colds they had and which they sometimes appear to contract by mere contact with white men. A Cuembí Indian who accompanied me down the river to Santo Antonio on the Solimoens, I left at this place awaiting an opportunity to return to his home. Three weeks later passing by Santo Antonio in a steamer I landed there and found the poor fellow in an almost dying state, with a terrible influenza and high fever. I left him some remedies and injunctions, but fear they came too late for his recovery, and he cannot have lasted long after my departure.

Carate is an hereditary disease, and by some is said to be contagious, but this there is apparently some reason to doubt, and at all events it is not easily passed by mere contact, though under certain conditions it may be, if this be frequent and continuous. Still it is not rare to see a husband "*caratoso*" and

the wife clear skinned, or *vice versâ*. In the mildest form of the disease the skin is merely blotched with dark or black patches, but when severe, the epithelium is black and the epidermis dry, squamous, and rough, the light horny flakes of which are continually being shed.

The Piojés are, like most Indians, usually taciturn and laconic with strangers, especially white men, but amongst themselves often chatty and merry, and if one has their confidence are easily amused with one's conversation as long as this of course is adapted to their understanding. When flagging at their work of wood-cutting, at which I had to employ them extensively, such jokes from me as: "Tuyo no sabiendo leña cortando," (*You don't know how to cut firewood !*), or "Tuyo chacra cortando no sabiendo tiene, mujer no será cojiendo" (*If you do not know how to clear the forest for a plantation, you will not get a wife*), this being the necessary matrimonial accomplishment, would make them all roar and shriek with laughter and greatly reanimate them to more strenuous efforts. Jocular sarcasm they always understood, and would continue exchanging with each other to me incomprehensible witticisms after such a remark of mine to one of them, as for instance: "Tuyo tabaco fumando no queriendo tiene" (*You would not like to smoke a cigar !*)

They are extraordinarily timid and cowardly unless drunk, in which state they sometimes become obstreperous. One night whilst I was staying at Yasotoaro, riotous quarrelling was going on in the house of an Indian named Simon, the most intelligent, hardworking, and generally most enlightened of the village, with two friends of his from Cuembi. For a long time the drunken broil continued, but at last it reached such a pitch that fearing that at any moment there might be bloodshed, we got out of bed and went round to try to quell the riot. The Indians in Simon's house were in such a state of excitement and making such a deafening noise that they would not and could not listen to the "corregidor" who was foremost amongst us, but Simon, when he saw him, began at once to resent the interference by saying, in the most impressive language he could use: "Nosotros blanco no queriendo; ese blanco mucho no bueno tiene" (*We do not want white men; this white man is very much not good*) and at the same time he came forward as if to make an attack. The "corregidor" at once gave him a blow with his fist full on one eye which knocked him down. In a moment all was changed, and the Indians were cowed into their usual taciturn timidity. Most others would not have cared much afterwards for having been knocked down, but poor Simon felt the degradation more deeply than I have ever seen in one of his race. His whole spirit appeared

broken from that moment and the blow he had received had entered into his soul. This unusual sensitiveness doubtless arose in great part in that he had had a good master for some time past, by whom he had been treated with great consideration as had he also been during his service under me. The following days he did not allow himself to be seen, but when I went away he came out to watch the steam launch depart, in which he had spent two months and a half of merry hard work with me. All his lightheartedness had gone and he barely wished me adios. His friends told me he had expressed the firm determination to leave the place of his humiliation and never to return. I felt deeply sorry for him; this show of feeling, however, was most unprecedented, for he and many of his companions had undergone much hard bondage before, under their exacting masters on the Amazon and elsewhere.

Whilst on this subject, I cannot refrain from noting a few words on the system of slavery, for it can be called nothing else, much in vogue on the Solimoens and Marañon, and I cannot consider the subject out of place here, as most of the members of the Piojé villages have had at some time or other, or chronically, to suffer under it.

The general impression amongst us is that the Indian is above all races the most unfettered and freest; that he wanders whither he wills through the boundless forest or over the plains, his only work being to build his hut and cut down the jungle for his plantation; the entire remainder of his physical strength, instinct, and censorial acuteness dedicated to ensuring success in the stealthy war he wages against wild animals and other wilder men. This impression it cannot be denied is mainly correct as far as the most isolated and barbarous tribes are concerned, or in a few cases where the maintenance of a warlike independence has been possible, but as regards the majority of the Indian tribes of tropical South America, best known to us through their having come into contact with white men or pseudo-white men, circumstances are widely different, and woe to the Indian's freedom when once he falls into the civiliser's power.

The method employed to enslave him is to get him into debt by tempting him with raw cotton drill, knife or beads. To clear off this debt he is made to work, but as he seldom, or actually in many cases never, is credited anything for his labour, his debt goes on growing and growing, and the bonds that tie him become firmer and firmer. If he runs away, which he is generally too timid to do, he is punished on his recapture, for the petty authorities in the Brazilian villages are the first to uphold a system which, though unjust, is their only means of procuring labour.

To give an idea of the realness of this slavery, I will relate a case of each sex; the one is respecting a man, a Consacunti Indian named Juancho, whom I knew well, and whose liberation was effected before me, and the other is about a woman, communicated to me by a trustworthy person who had been in the village where it occurred, as also had I a short time afterwards.

Juancho had been brought down from his native place to Tonantins by a New Granadian Mulatto to settle in the village with his master.

When the expedition which I accompanied was about to set out on the journey to ascend the Putumayo, Mr. Reyes, the originator of the scheme for opening the navigation of that river, endeavoured to get together as many of the Piojé Indians who were in Tonantins as possible, in order to take them back to their homes, and that at the same time they should make themselves useful on the journey. Amongst such Indians, the liberty of a number of whom was bought from their masters, was Juancho, and we found out through the others that he also wished to return to his native place after his many years of enforced absence. We ourselves asked him, and he said he wished to go, so we called his master and told him that we contemplated taking Juancho with us as he was being detained forcibly. Of course at the same time Mr. Reyes offered to make good whatever he might owe his master.

The master, very wroth at such interference, replied that he did not think the Indian wished to go, and in effect upon our again questioning Juancho on the subject before him, no answer but that he wished to stay could be elicited. He was in fact so cowed that he did not dare, even in the midst of us and his fellows, to utter a word that he thought might raise his master's ire, or take a single step for liberty in the presence he feared. Upon investigating the matter further, we finally found that Juancho had been there some years working positively like a horse, with insufficient food, many hard blows, as deep scars upon his person testified, with clothing of rags and a heavy debt of money to his master. All that he had received, less than the necessary clothing, and even the axe with which he chopped wood for his lord to sell, were debited to him, but in compensation for his years of constant labour, nothing had been or probably ever was intended to be credited to the unfortunate as wages.

The other case of a young Indian woman to which I refer was as follows: She had been transferred from her previous master, as is frequently done, by payment of her debt, a trifling sum, and thenceforward had to work for her new master. She had toiled for him some considerable time, as women do toil and

drudge there, and had increased her debt by a few milreis for absolute necessaries, when she finally decided to leave him, and indeed effected her purpose. She was brought back, but being possessed of some intelligence, and a sense of the injustice practised upon her, she appealed to the local authorities, and claimed freedom from debt if compensation for her work be set off against it, the work done being far in excess of the amounts she had received. Her claims were all disallowed, and she was forced to return to her master, who be it furthermore remarked had accomplished criminal designs upon her, for which she also demanded some satisfaction and her liberty.

Now I do not wish to assert that all cases are as flagrant as these, but be it how it may, the poor unprotected and apathetic Indian is constantly taken from his home and restrained by unfair means to work for years against his will without any proper compensation; and farther up the Marañon, on the Napo and other rivers, children are still frequently stolen for servants. There must be some glaring injustice that where labour is so scarce and so valuable, a hard-working man or woman does not receive sufficient even to pay for the scant and miserable clothing necessary. Whilst the emancipation of the Negro is progressing in Brazil, the poor Indian still labours under his bonds unnoticed.

Some of the Piojés who have travelled far, and have had the good fortune to return home, use firearms, but their own weapons are "bodoquera" (blow pipe), spear, and lance. The lances are very well made, of six to eight feet in length and tapering from about half-an-inch at the hilt. In the fore end a sharp needle of chonta about two or three inches long, is inserted; this is dipped in poison and breaks off in the flesh of the animal struck. Although the bow-and-arrow is not one of their usual arms of offence they are wonderfully quick in gaining proficiency in its use when on the Solimoens, where turtle catching is only allowed by its means or by harpoon.

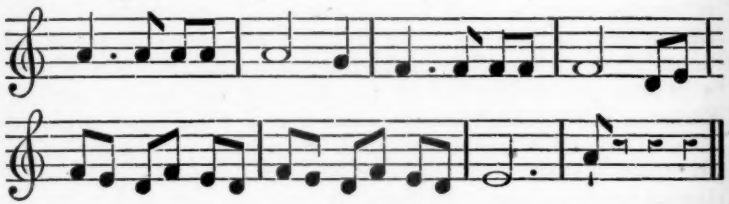
The superstitions of the Piojés differ little from those of other tribes in the same tract of country, but some of them are worthy of enumeration, as not only having a hold on their minds, but also on those of some more or less educated white men, who have spent a considerable portion of their lives in the wilds, but on whom one could not imagine such false beliefs could make any impression. One of these, actually practised by a white man of my acquaintance, is that in order to attain proficiency in the use of the bow-and-arrow, and to aim well, the hands should be placed amongst the terrible "Sänba" ants to be bitten by them. Another similar practice which I saw two Piojés indulge in with the same object was when they caught two scorpions one day,

to cut off their sharp stings, the last caudal joint, and scratch their arms severely with them.

Another white man, a New Granadian of considerable intelligence in whose company I spent a long time, together with the Indians, most firmly believed in the efficacy of a vegetable preparation, kept always in an alligator's tooth, for the cure of snake bites; but the extraordinary part of this is that the faith is not placed in the preparation itself applied to the wound, but in the fact of its being kept in an alligator's tooth, without which it would be looked upon as quite valueless.

Another very curious custom is that of both father and mother fasting for days after the birth of a child. Sometimes this is kept up so long that it is a wonder that at least the mother does not sink under the debilitating ordeal. If the father is away from his wife he also fasts three days on hearing the news that she has borne him a child, as some of the Piojés assured me.

Before concluding this far from exhaustive subject, it is pleasing to me to be able to record that music and art, although most primitive, are not quite unknown to this interesting people. Their music is extracted mostly from a short thin bamboo instrument, called "bobona," with one hole to blow in and one by which the sound is modulated by shaping the hand outside, One man though had a sort of "dulcinea" (a kind of flute-whistle) on which he played the following notes, which I give as their highest development of melody.



The fine arts are known only in the adornment of the person, and painting is restricted generally to the face, but less frequently also to the hands and feet. In painting the face great care is bestowed to make the lines on both sides symmetrical, and these delineations sometimes approximately trace the natural furrows on the forehead and around the eyes and mouth. Upon my offering to embellish a Piojé with the brush, and the red paint which they always carry with them, he at once acquiesced, and submitted most seriously to my roughly sketching a sort of death's head on each cheek and a laughing face on his nose. He did not wash it off for days.

VOCABULARY *of the* ZAPARO LANGUAGE.

Compiled by A. SIMSON, Esq.

NOTE.—*Pronunciation as in Spanish.*

One	Nucuáqui.
two	anamishiñáqui.
three	aimucuraqué.
four	manucuaquicuajuótsa (Supinu).
or	huetsaramajáitiaca (Yasuni).
five	mánucua (*See* Foot).
above five, many	mánunu.
Man	Táúcuo.
woman	itiúmu, pl. itiumuéra.
son	niáno.
father	cúmanu.
mother	mamajá.
sister	cuíña.
brother	cuánana.
medicine man	shimáno.
devil	samáro.
friend	yanása.
husband	quiráno.
companion	ároco.
savages (aucas)	mehuáno.
partridge (small species)	neguá.
wild turkey (pava)	catsagüíña,
curassow bird (piuri)	camarána.
„ „ (pauji)	piócua.
trumpeter „	matsácu.
mangoe (oriole)	mucútso.
crow (shira)	tsicséca.
turkey buzzard	amúcua.
domestic fowl	ataguarítui.
eggs	ícucua.
birds (in general)	pisháca.
macaw	surá.
jaguar	imatíni.
tapir	yasúcua.
capibara	acáíya.
fish	maráishi.
pecarri (smaller species)	cáshi.
„ (larger „)	yári.

agouti	täurĭjia.
deer	niquéro.
dog (domestic)	ariócu.
„ of the woods (perro del monte)	píñocua.
turtle	yaurícha.
snake	cóno.
tarantula spider	cononáca.
monkey (Simia caraya, Hum)	patócua (compare ucan).
„ (Machin)	cuatéco.
„ (Mycetes palliatus, Gr. ?)	tsitsócua.
„ (Simia seniculus Linn.)	aritiócucua.
„ (S. paniscus, Linn.) ..	áítio.
„ (S. sciurea, Linn.) ..	quiócua.
„ (Chichico)	ítseca.
The forest	nácu.
fire	anamishúcua.
water	muricha.
sun	yanócua.
moon	cashícua.
heavens	níacöuhira.
earth	rapáca.
rainbow	hüiatche.
light (fire)	nuntána.
firewood	aishócua.
salt	ichójua.
charcoal	unishíac.
ashes	unámujua.
rain	humáro.
wind	párato.
sandbank, beach	ayójua.
tree	nacúna.
log	hámaca.
snag (in the river)	aguána.
leaf	juéca.
tobacco	jaunéca.
pimiento (capsicum)	anacúcua.
thorn	ijióto.
wax	tupáca.
maize	säuco.
cassava (yuca)	múe.
plantain	pujióca.
poison (for darts)	numánaca.
clothing (cotton cloth) ..	shíro.

chicha	casúma.
paddle	táquiotaca.
punting pole	caráhuana.
canoe	yára.
gun	imacána.
knife	sapúcua.
axe	cajícua.
lance	acachíne.
pot (earthen saucepan)	cóushima.
bowl (calabash)	samarico.
fan (for the fire)	apítio.
food, victuals	atsactsáca.
broth, gravy	nacuácone.
blow-gun	numanúcuá.
head	ánaca.
eyes	namíjia.
hand	ichiosú.
arm	curamáso.
nose	najúcua.
mouth	atupáma.
foot	iñocuá (*see* 5).
leg	íñácu.
fingers	cansúa.
calf (of leg)	tanúmaco.
hair	naquéso.
lips	yatsócue.
seat	tapuáco.
belly	tahuáca.
entrails	maráca.
blood	nanáca.
skin	puetsócue.
soul, spirit	tsóhuano.
Where	taïte.
here	aní (*see* Near).
there	áti.
far	táicua (*see* No).
near	aníti (*see* ucere).
yes	ingyá.
no	áïtia, taicuá (*see* far).
small	nichacáqui.
high, tall	nauco.
large	queráitio.
heavy	iñáca.
light	suáca.
how many, how much	tiáiqui.
early (in the morning)	taricágue.

I	cuí.
thou, you	chá.
my, mine (prefix)	cu.
he	no.
they	notena.
(plural termination)	(cu, era).
hard, with strength .	anajicha.
hard, dense	tocúru.
thin	másecu.
fat, stout	cúëro.
fat, greasy . ..	tsutúäno.
idle, lazy	secáno.
in love	míocuashianó.
bad	cóshicha, sacushíno.
stingy, mean	jumuitúcua.
red	natúcua.
to-morrow	tariqúe.
I go, I am a going	cuicuáraja.
Go with me, let us go ..	páicuámaja.
Come	aníma.
Come thou (imper.)	chananíma.
He comes	nonaníma.
Let us go into the forest ..	icuá nacujiña.
no, there are none (negative). .	taicuá.
to eat	chatsácua.
eat thou (imper.)	chatsá.
give me	chacuiñó.
bring me	tiantiama.
thou shalt bring	chañantiáma.
tie up (imper.)	chamaró.
twist „ (of rope) ..	chanucuasóni.
paddle „	chataquío.
drink „	charatú.
where are you going? ..	tai cha táicuáca.
go thou (imper.)	cha-naicuáma.
what is it?	catsacá.
what is this?	catsacáte.
what pains you	catsacáte quíranu cuícha.
what are you looking for? ..	catsacáno.
call him, call thou (imper.) .	cha-píño.
he calls you	no píñocuche.
he calls us	no piñocúpue.
it must be they, these are the ones..	nucuajatèna-iquícha.
bad chicha	socoshícha casúma.

NOTE by Mr. HYDE CLARKE on the ZAPARO VOCABULARY.

THE foregoing vocabulary is an addition to our knowledge, being independent of that of Osculati.

The only South American language appearing to me to be allied to the Zaparo is the Iquito.

That the Zaparo is, like all other American languages, allied to those of the Old World, appears by a comparison with the Gurma and Guresa of Africa and some other languages.

	Zaparo.	
Tapir .. (Elephant)	yasucua	ndshogo, *Orungu, &c.*
Jaguar ..	imstini	(muticst, kamutera, mutimu, *Guresa*).
Egg ..	icu, icucua ..	akud, *Koama, &c.*
Parrot ..	sura	kiara, *Guresa, &c.*
Knife ..	sapucua .. .. (sipah Catawba Namer.)	sippo *Gshantee.*
Pot, Bowl ..	samarico	samanera, *Guresa.*
Eye ..	nami, namijia ..	namu *Gurma.*

The corresponding forms for knife will be found in my paper on weapon names in the Journal.

The above are not the only evidences that a casual survey has shown, but there are many words. [One matter also deserving of observation is that the affinities of Zaparo are to be found in Africa among those languages of early culture, from which proceeded the Akkad of Babylonia, the Lydian, Phrygian, &c., the Etruscan, and the present Ugrian and Japanese, as well as the Ponio of North America.]

ANTHROPOLOGICAL MISCELLANEA.

A modern Chinese View on Heredity and Education.

(*Translated by Lavington Oxenham, from the Chinese Original.*)

Man received his form from the conjunction of the primeval 氣 essence of Heaven and Earth. All space possesses this essence and is filled with objects. Man is made from the purest (正) portion of this essence; the various other things from the inferior portions, which, scattered about at random, make various combinations from which are developed the mammiferous, oviparous and other classes of animals, man still remaining the one spiritual creation. Men being thus alike, we are unable to explain why the children of scholars and high officers are in the majority of cases so extraordinarily intelligent, whilst the children of agriculturists are even up to extreme old age, loutish and common-place. Place men of the two classes before you, and the difference will be at once discernible, and on entering their houses you will mark the same distinction between the parents. Thus we find the essence primeval cannot be altogether pure. If it be turbid, the form is heavy; if pure, then light; this is how men become either intelligent or stupid. Scholars, by heredity, are always brilliant and clever, and attain to perfection in their studies with ease; but an agricultural family, attempting to change its mode of life and study, never gains renown. Thus a way is shown by which men of talent can be plucked out from the mass. Men from the North are honest, heavy, rough, outspoken fellows; but from the South they are brighter and more intelligent, more refined and ingenious. Nevertheless, brightness or dulness cannot be said to depend wholly on locality. Brilliant men, easy to teach, are numerous in the North; whilst foolish, ignorant blunderers are not few in the South; and to choose men solely from their physiognomy would be to make mistakes. In Anhui, a beggar woman has taught her dog to beg for her, and it enters houses and sits up asking alms—and are not dogs brutish? Travelling conjurors carry about monkeys which they dress up as men, and if an insufficient amount of *cash* is given, the animals refuse to perform—and are not monkeys brutish? Dogs answer to a certain call, cats to another, and bamboo fowls can understand signs, and are not they all brutish?

These animals are created from the scattered and inferior portions of the primeval essence. How is it then that man, created from the conjunction of the purest essence of Heaven and Earth, is so often found to be utterly incapable of instruction! In antiquity, men were classed as superior men and as rustics, not because they differed in birth, but because their work and duties were dissimilar. Were this not so, how could the statement of man's nature being originally good have originated; or the further one, that some men are born good, but others require instruction to make them so? Still we do not affirm high and learned families always have excellent sons. At times may be seen a young gentleman with hair jet black and glossy enough to serve as a mirror, with white skin, pencil eyebrows, and intelligent eyes. Their fathers are deeply read, or of ancient family; their mothers, too, are well descended or have married when young; there is no lack of money for the young hopeful; his dress and *distingué* appearance make him eminent in a crowd; teachers are obtained for him, fathers watch over him, and neither trouble nor expense are spared. Yet when brought out he is found destitute of any trace of learning, is unable to reply when questioned, and goes about as if he neither saw nor heard anything. On the other hand, there is the villager who digs and delves for his living, who has not among his kindred one learned man, and who has to obtain instruction from some croning old teacher. In his own locality he soon becomes famous, and is regarded as a semi-inspired, and is advised by his family to devote himself exclusively to study. After some years he may then gain a name, may become illustrious as an official, or celebrated as a scholar, but he still resembles in look a herdsman or duck driver, with hair dishevelled, yellow face, dark skin and a clownish lumping gait, just like his ancestors. Is not this quite unexpected and strange? The present heterodoxies and extravagances arise solely from lack of instruction, without which errors can never be amended. Rich or learned men all have the younger members of their families taught, and completely, or at least apparently. But villagers are unwilling to instruct them, so completeness is not attained even in appearance. The instruction of the holy men was never designed for only one class, but it is extinct—the name, not the reality, surviving. Hence the spread of heterodoxy! instruction is not searching, and so men doubt, bad men seduce them away, and the people sink more deeply than ever. If antiquity had come down to our time with its allotment system, its schools, its feasts, its archery, and its study, then superiors would have been acquainted with ceremony and poetry, and villagers would have respected their princes and elders. If it be said that only the eminent can be instructed, and that the foolish are incapable of it, how was it heterodoxy never existed at the time of the three dynasties? To come down to our present times, every locality has its local officials, high and low, to whom all things revert, who are responsible for everything, their ordinances are searching and severe, as manifested in the Ch'ü-shan riots and elsewhere, or in the miracle-mongers at

Nanking, or the impostor Wang in Kwang-tung—all village busybodies and foolish. If it be argued these people are too stupid to be taught, or to be worth teaching, whence comes their audacity, their temerity in treasuring up grudges and acting with such recklessness? If they are stupid villagers incapable of instruction, why do they listen where they should not, and stoutly believe and show earnest conviction? Thus turbid heavy primeval essence produces both foolish and intelligent. Those whom instruction cannot reach, if strong, become rebels; if weak, turn to magic and scepticism; those, too, who have not broken law, but are punished, though uninstructed, for slight faults, are treated improperly. Yet these foolish unteachable people are moved to tears at the sight of acts of loyalty, filial piety, chastity, or righteousness, at theatricals or shows; often, too, they chat in arbours and tents about ancient and modern times, whilst an elder, seated in the place of honour, is surrounded by listeners to his never-failing stories of past dynasties with their fortunes and mishaps, their ruins and their retributions, and these foolish people again are moved and touched by such things; there is, too, the old man with the wooden clapper, who calls at the door on his mission (of story telling). Such means as these officials and gentry can use to instruct. But instruction is not used, but punishment; and hard then does it become to prevent rebellions, heterodoxies and suspicions. For our part, however, we should be best satisfied if Heaven and Earth would produce only the pure and light essence, and education be dispensed with altogether.